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FOREIGN

American Cinematographer

☆ THE MOTION PICTURE CAMERA MAGAZINE ☆

August
1942

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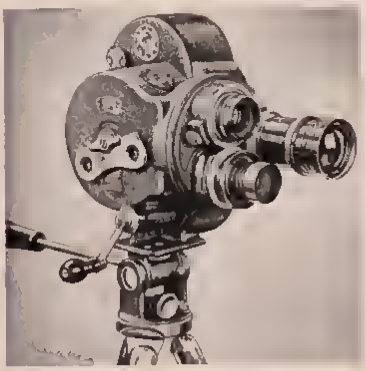

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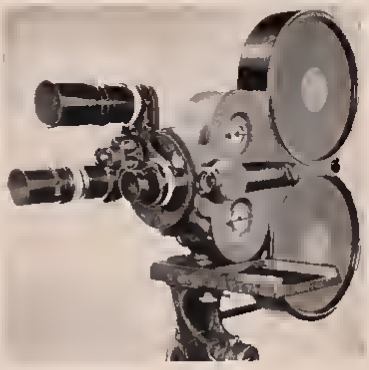

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THE MOTION PICTURE CAMERA MAGAZINE

VOL. 23 AUGUST, 1942 NO. 8

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The Front Cover

This month's cover shows Rudy Maté, A.S.C., filming a scene for Goldwyn's "Pride of the Yankees." Note shadow of overhead scrim which softens sunlight on Gary Cooper, and use of "booster" lights for front and back-lighting. Photo by Hal McAlpin

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The best 16mm. camera and sound equipment can, like the B-M camera shown here, be used almost exactly like 35mm studio equipment

"PRE-PHOTOGRAPHING" IN 16MM. AS A MEANS OF CONSERVING FILM

By LEE GARMES, A.S.C.

WHEN you build an automobile, a tank or an airplane, there is no difficulty in determining how much material will be needed, or how and where material can be saved in producing it. You need only look at the blueprints, and all that information is at your fingertips in mathematical black-and-white.

Now that wartime necessity has focused our attention on the need for conserving film and many of the other materials that go into the production of motion pictures, many of us have felt that some similarly accurate method of making a precise pre-production blueprint of a motion picture would be invaluable in our efforts to conserve film and materials. With such a blueprint, we ought to be able to stop most of the industry's film wastage *before it happens*. Without it, we can simply skim the surface of the subject, getting off, so to speak, the top layer of waste, but leaving most of it undisturbed because we can't put our finger on it until it makes itself visibly evident—after which, of course, it's too late to remedy.

Such an approach is rather like a doctor who attempts to cure the symptoms of a disease rather than the cause. For example, it is very obvious that almost all of our film wastage is traceable to over-shooting, some of which can in turn be blamed upon over-written scripts, but much more of which is caused by the fact that we habitually—in many cases, necessarily—expose considerably more negative in filming a picture than can possibly be compressed into the picture's final release footage.

During the last six or eight weeks, we have begun to find out that it is not too hard to cure some of these surface symptoms. For example, it is not too difficult to put into effect a policy whereby scripts must be written with only the approximate number of scenes which can be contained within the production's scheduled release length. Neither is it so difficult to agree that except in instances where the contrary is absolutely unavoidable, action should be so thoroughly planned and rehearsed that it can be filmed within an average of, say, three takes per scene.

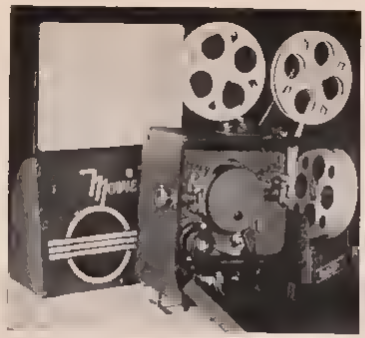
But when you get things streamlined to this point, you reach the point where motion picture practice begins to diverge from that of the manufacturer with his blueprint. For it is at this point that the variable factors which are peculiar to motion picture production come into play.

Suppose, for example, you start production with a script which, while still in the scenarists' typewriters, has been pared to the bone, so that instead of the 1,000 or 1,500 scenes we've all seen in scripts in the past, it contains but 450 or 500 scenes, which experience tells us ought to be about right for the average 8-reel feature. Assume, too, that you have a director, cast and technical crew so efficient that you can be confident of averaging but two or three takes per scene for the entire picture.

The average business-man or manufacturer, accustomed to figuring materials out on a blueprint basis, would say instantly that under such conditions, you ought to be able to bring the picture in with an expenditure of about three times the footage of its release-cut negative—say 25,000 or even 30,000 feet, to be on the safe side. But anyone experienced in motion picture production would say that you'd be doing uncommonly well if you get the picture completed with only 60,000 feet of negative exposed, and that many major studios and directors would consider they'd achieved something remarkable if they did it with 100,000 or 150,000 feet of negative shot—exclusive of retakes and added scenes!

Unfortunately, that "perfect" script isn't a real blueprint of the picture, in the manufacturer's meaning of the term. It details the dialog and at least outlines the action, while the sketches of the art-director and production designer complement it by suggesting something of the visual appearance and flow of the scenes and sequences. But none of them can blueprint how a scene will "play," or how scenes and sequences will cut together.

Two different actors playing the same scene will very probably give the identical script action entirely different tim-



Portable sound projectors like this one permit studying the 16mm. blueprint scenes on the set

ing and "business." One may require twice as much film as the other. Inexperienced actors will "muff" more takes than experienced ones. In the same way, two different directors might give the same sequence entirely different treatment: one might play almost the entire sequence in short cuts and simple setups, while the other might use longer scenes, with extensive use of footage-consuming camera-movement and follow-shots. One might virtually cut the sequence in the camera, while another might shoot each cut with generous overlaps, and include, as well, a very generous assortment of ad-libbed business and added angles to give the cutter an abundance of material with which to work.

In each case, an entirely different amount of film would be required. On one extreme, you might finish shooting with a picture which required little more than cutting out the slates to get it to its release footage. On the other extreme, you might emerge with a picture which, disregarding the excess footage shot for protection and cutting purposes, would still require the elimination of 10,000 or 20,000 feet between the first cut and the final release-cut version. And of course as regards entertainment quality, the amount of negative exposed or conserved in producing the picture need have no bearing on the film's intrinsic merits.

But—suppose that before a picture went into actual production, everyone concerned, including the producer, the director, the players, cinematographer, writers and film-editor had had a chance to make and analyze a working blueprint of that picture? Not a mere written or sketched outline, but an actual working model of the picture, in the motion picture medium, so that they could study every detail of the picture beforehand, in terms of actual footage, cuts, angles, timing and business. They could tell in advance precisely what scenes were necessary to tell the story to best advantage, and exactly how they would cut together. They could predetermine with almost 100% accuracy just how much footage to allow for the picture as a whole, and for every given action. Each scene could be shot right to the desired frame, with no overlaps and almost perfect efficiency. There should be no retakes, for the picture as shot would fit together precisely as indicated by the blueprint!

This sounds like an absurdly impossible ideal—but it is thoroughly practical. The means and methods are already at hand, if we want to use them.

For several years, a number of our studios have been making extensive use of 16mm. as a means of making tests quickly and economically. My suggestion is that we simply extend this idea to its logical conclusion, and instead of confining ourselves to the making of individual tests in 16mm., *"pre-photograph" the entire production in 16mm., to provide that needed blueprint!*

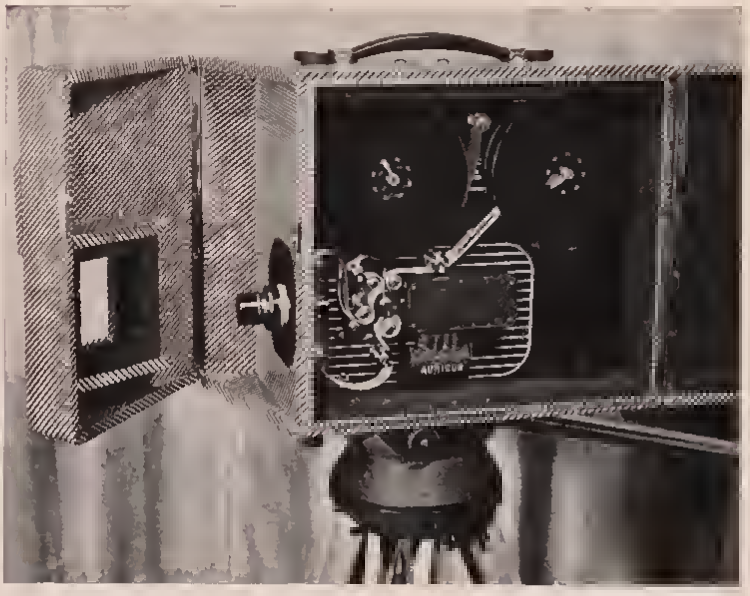
It could be done with existing equipment, very easily, quickly and economically, and it would show the way to immensely worthwhile savings of film and other critical materials, to say nothing of effort. Making a test-production like this would require the services of the director, cast and technical staff for a few days in addition to the film's normal production schedule, together with the expenditure of perhaps four or five thousand feet of 16mm film. But it would result in saving from 50 to 90% of the 35mm film that would otherwise be used in making the picture, and it would in all probability shorten the 35mm production's shooting schedule appreciably, since everyone concerned would have the advantage not only of having done each scene and sequence previously, but of working almost literally from a blueprint, since they could use the 16mm scene as a direct guide while filming the corresponding 35mm. ones.

I see no reason why the 16mm. "pre-production" should be made with any particular attempt at making it a perfectly finished production. Camera-angles, directorial treatment and action should of course be treated with painstaking accuracy, as should timing and tempo. But photographically, for example, the 16mm version should be of almost elemental simplicity. Dramatically important photographic effects (like the silhouetted murder-scene from "Algiers") might be sketched in roughly, but in general the lighting and photographic treatment should be kept routine, in the interests of speed. The perfecting polish (not to mention the glamorizing personal lightings) could come in the final version.

It would seem logical to shoot these test-scenes, wherever possible, using the actual sets erected for the production itself, certainly, at least, in the case of key sets. Less important sequences, and particularly those where there might be any reasonable question as to whether or not that action could not be satisfactorily telescoped into other sets or scenes, might as well be filmed on standing sets of the general type required for that action. If after this try-out it was found that the set or action could be eliminated, it could be done *before* the set was constructed, rather than afterward.

These test-productions could be shot in sound, and probably should be, to reap the fullest advantage from the idea. Excellent direct-16mm. recording equipment is available in both double-system and single-system types. Some

(Continued on Page 382)



Single system 16mm. sound cameras like this Auricon are stripped to minimum essentials yet give picture and sound quality that is more than adequate for pre-photographing a 35mm. production

Animated Cartoon Production Today

Part V—Painting, Photographing, and Re-Recording

By CARL FALLBERG

THE home stretch has finally been reached when the cleaned-up animation drawings receive an "Okay for Inkers" from the director in sweatbox. From here on in, it's no-stops until the final Technicolor print is made. The tortuous path to that final okay has already been described—the multiple processes, the complicated steps, the vast amount of overlapping work necessary by many people to transform an idea into working animation drawings. It has been pointed out that a state of flexibility as regards changes exists during all of these processes, but when animation is "Okay for Inkers" the seal of approval has been put on it. The animation represents the best of the animator's ability to portray a story idea. The idea at last is ready to receive its final polish and be dressed up into color and form.

The period now arrives when all of the final elements that make the cartoon live on the screen are prepared, mixed and blended together into an amalgam of color, sound, movement and music. Of course, all of these elements aren't suddenly dumped into the picture at once but are completed and added each in its turn. First, the animation drawings are traced onto celluloid, then painted and photographed over the finished backgrounds. Music, meanwhile, has been composed and recorded; final sound reels are assembled, and re-recorded into one sound track which is added to the picture at the time the Technicolor release prints are made.

But since animation is the key process about which all other activity in the studio centers, the further progress of the animation drawings will be taken into consideration first.

After being given their okay, the drawings are shipped off to the Inking Dept., getting a final checkup en route to make sure that the mechanics of the scene are correct—drawings in the proper order, numbered correctly, camera and pan moves accurate, etc. Every component of the scene must be correct down to the last frame.

Inking literally implies tracing the animation drawings onto celluloid with india ink. However, it is more than simply tracing. It is really a re-drawing of the character. The inker must transpose the animation drawing onto celluloid, retaining as much of the freedom, construction and spontaneity of the original as possible. This calls for much more skill than just the ability to trace. It's no cinch to swing a smooth, even pen line across a slick "cell" and accurately follow the outlines of the pencil drawing. A deviation of only the thickness of a pen line might be enough to destroy the feeling or construction of the drawing. An examination of the inked cells illustrating this article will indicate to what extent a good inker is able to retain the feeling and expression of the original animation drawing.

As a matter of technical interest, the cells are of the acetate, non-inflammable variety and about 5/1000 of an inch thick. Ordinary black india-ink, with an element added to make it adhere to the cell, is used and is applied with a Gillott's No. 290 or 303 pen. The pressure of war is strongly felt in the cartoon industry, since celluloid is high on the priority list. Cells, rarely used more than once because of vulnerability to scratches, are now put into service two, or even three times. Various chemicals that go into the composition of cell paints have been made unobtainable by priorities, so the paint laboratory is busy developing substitutes.

All inking is done on the front side of the cells, the paint being applied on the back. The inkers work on boards fitted with registering pegs that fit the punch holes in the cells and animation drawings. For the average cartoon, black

Above, a cartooned lightning flash. The left-hand picture, with rain animating in front of it, is used for most of the scene, and the lightning effect produced by substituting the right-hand picture for a few frames.

Left: color model that guides the cell-painters. Right: evolution of a scene from Bambi: from animator's rough extreme through clean-up drawing, inked cell and painted cell, to the final scene with finished cell in place over the background.

ink is used to outline the drawing, but in a picture such as "Bambi," where more realism and roundness in the characters is desired, a grey outline is used. Black outlines and the flat tones of the cell paint impart a one-dimensional, "cartoony" feeling to the characters which tends to be inconsistent with the halftones of the background. This discrepancy isn't too obvious ordinarily, but in "Bambi," realism and convincingness of characterization took precedent over accepted cartoon technique.

The inker has to keep a careful eye on technical instructions regarding tracebacks, held cells, and registering of characters to the background. A "Color Model" (illustrated) is provided, defining the types of inks and paints to be used. When completely inked, the cells are sent to the Painting Dept. for coloring.

The paints are applied in flat tones, on the backs of the cells, within the areas as indicated by the inked outlines. This process, while not quite as exacting as inking, requires a sureness and steadiness of hand, besides the all-important patience. Each painter usually handles all of the colors that are to go onto the cell—numbering anywhere from six to several dozen.

The paint laboratory, where the mixing of the colors takes place, maintains a "library" of about 113 separate hues, with seven values, ranging from dark to very light, for each hue, giving a total of more than 800 colors to work with. And a feature cartoon might well use every one of those tints.

The paints themselves are specially mixed at the studio, from formulas developed by trained chemists in a complete laboratory maintained for just that purpose. The pigments are obtained from many sources—animal, vegetable and mineral. One type of black, for example, is obtained from the residue of burnt bones.

The paints dry on the cells in about twenty minutes, but are by no means permanent. They eventually dry out and chip off the cell. In order to slow down the drying out, a relatively high humidity is maintained in the air of the painting and camera departments. The paint laboratory is constantly at work on the problem of developing paints that will resist drying and chipping. However, permanence of either paint or cell beyond a certain point is hardly possible, as the celluloid itself dries out and cracks in time. After the cells have been painted, some of them may be side-tracked to special artists for shadows or special effects. Shadows are painted with a transparent paint, and the air-brush is used for dust, certain types of highlighting, etc. For speed effects, where forms are streaked or blurred, the paints are dry-brushed on. At times, a dry brush tone is used to help give roundness to a form.

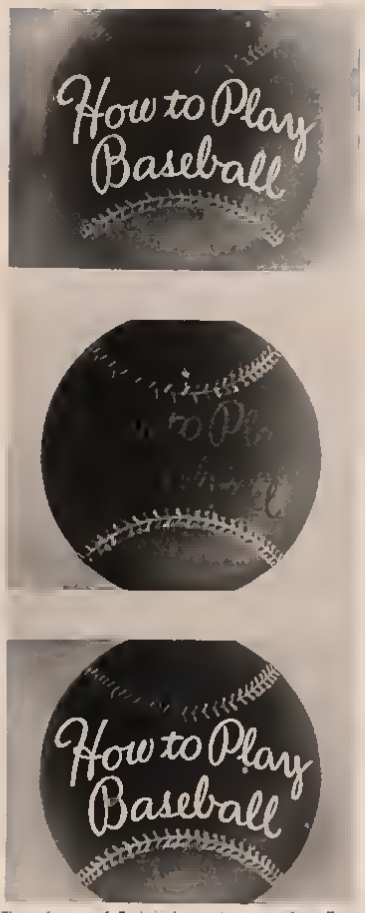
Transparent shadow paint is only practical for small areas. If the shadows are large, they are generally double-exposed onto the scene. In this case, the shadows are animated separately, painted in flat black tones, and after the scene has been shot once with the regular cell setups, the film is wound back and the shadows "d.x.'d" on at perhaps thirty percent exposure. This method gives a natural transparency to the shadows that cannot be obtained by paint.

The problem of working out practical color-schemes for the characters is tackled by the layout-man and color-model department. Many considerations enter into choosing a color pattern for a character. The patterns must be fairly simple, so as to be easily animated. Complicated patterns involve a lot of extra work and expense. Inharmonious patterns are avoided as are colors that would be out of key with the background. Bright, uncompromising colors are hard to look at, and so, in general, the tendency is to use subtler, pastel shades in the coloring of characters.

These color-schemes are carefully planned. For example, the color scheme of a "sunlight Bambi" is considerably lighter than that used when the character is supposed to be in shadow. Also, Bambi as a new-born fawn is lighter in hue than at maturity. In winter, he is handled in dull gray tones, in spring, in warm browns.

When painting is completed, the checking department again takes a final look at the technical correctness of the scene's mechanics, and if all passes muster, the cells and finished background are sent to the cameras to be shot.

The shooting of a cartoon is the most mechanical procedure in the entire production process, and it is one of the most exacting. The instructions on the exposure sheet must be followed down to the last frame. It isn't a matter of simply sticking the cells under the camera and pushing a button to expose the film. Pan moves, tabulated to accuracies of 1/64 of an inch must be made. The camera itself also might be called upon to move towards or away from the set ups, or around within the 5 or 6½ field limits. Pan moves and trucks often require the services of two or three men



Three frames of Technicolor cartoon negative. Top blue-filtered frame, center red-filtered frame, bottom green-filtered frame.

besides the regular camera-operator.

The cell and background set-ups are shot flat, the camera mounted on a movable crane directly above. On each side are two banks of incandescent lights, adjustable to varying degrees of intensity. The cells are held in register over the background by a set of pegs exactly like those on the animator's board. At the moment of shooting, a glass platen is lowered on the entire set-up and held tightly against the cells by air-pressure to prevent any wrinkling or buckling.

Cartoons are shot with a black-and-white camera, fitted with a revolving filter for the three color values, on a single negative by the successive-frame method. Each set-up is automatically exposed upon three separate frames of film, each frame registering one of the primary colors of the Technicolor process. Synchronized to the shutter shaft of the camera is a revolving filter fitted with three filters—a blue filter which registers the yellow-printing values, a red filter for the cyan (blue) printing values, and a green filter for the magenta-printing values. The three frames are exposed in that order by the camera operator pressing the button once.

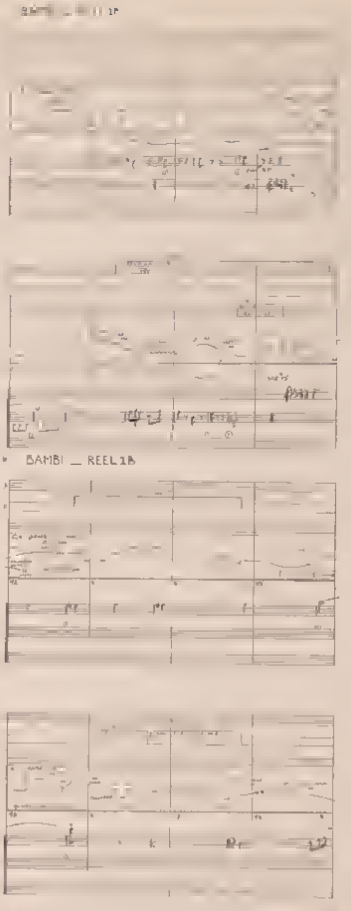
This successive-frame method has a decided advantage over the regular three-negative system as used in live-action Technicolor in that it simplifies camera operation and processing because only a single negative is used. Any ordinary black-and-white camera can be converted for Technicolor simply by adding the filter-wheel. Of course, the successive-frame system obviously wouldn't work for live-action, but it is ideal for animated cartoon use.

When completely shot, the scenes are again checked in the form of "color dailies"—similar to live action "rushes." These dailies are the first color prints that are returned by Technicolor, and are without sound. The layout-man, color coordinators and camera department representatives view these dailies and check them for technical correctness and color balance. If okay, they are cut into their proper places in the test reel in place of the black-and-white animation tests.

Meanwhile, other departments are busy organizing the elements of sound and music that are to be added to the picture. The musician has already spent long hours composing a score, and longer hours arranging it. The timing of his musical sections is carefully checked against the final footage of the picture. As was mentioned in an earlier installment, cartoon music is of two definite types. One, of a pre-established timing and pattern, to which animation is fitted, and the other, in which music is written to fit the action. The former presents no problem to the musician. He can give free reign to his musical imagination, and it's up to the story man and animator to compromise to his harmonies. But on the other end of the line it's a different story. With story, animation and timing already set and unalterable, the musician must not only design his melodies to the feeling of the story, but also to adhere rigidly to the timing of the action.

The musician will try to get a consistent overall tempo set for the picture before it goes into animation, and if he's lucky, it remains as such all the way through production, thus simplifying—comparatively—his composing, and later, recording, problems. But if he's not lucky, if the timing gets kicked around, a few frames added here, or a few taken out somewhere else in the interests of the animation, the final tempo of the picture is liable to vary considerably from sequence to sequence. This presents no unsurmountable creative hurdle, but it makes for finer musical feeling in a picture if a fairly consistent tempo can be maintained.

The musician works on a score on which is indicated the exact footages of all the scenes, the positions of dialog and sound-effects, and pertinent information relating to the action. He might have the picture reel on a Moviola alongside his piano to refer to. Then, with



Musician's score sheet for the scene from Bambi, the animation of which was illustrated in the May and June installments of this series.

the intent and purpose of each scene in mind, he begins sketching in the music on the score sheets, working back and forth between piano and pencil as he tries out chords, runs and harmonies, struggling just as hard to get a proper feeling of suspense in a certain passage or a fresher slant on a springtime theme, as a story-man or animator does to perfect the pictured action that goes with it.

When all of these basic melodies and harmonies are sketched in, an arranger goes to work and breaks down the music for orchestration, scoring parts for the various instruments. The orchestration is then divided off into "takes" of various lengths ranging from a few feet upwards to a hundred, depending upon the phrasing of the music itself. Recording the music in short sections at a time makes the job of rehearsing and recording much easier all around. These various takes can be easily cut into sync with the picture reel according to their respective measure numbers.

For the recording of music to a definite, unchanging rhythm, each musician

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Left close up of welding from one of Raphael Wolff's films right making a close up of welding operation Note shield on camera and high-powered spotlights employed Below frame enlargements from Emerson Yorke's films on shop training Upper frame shows use of stroboscopic lighting synchronized to motion of drill and camera lower frames show use of transparent lucite to show action of tap inside metal

MAKE 16MM BUSINESS MOVIES THAT HELP THE WAR EFFORT!

By W. G. CAMPBELL BOSCO

IN LOOKING over the 16mm. commercial-film field after nine months of active participation by this country in the war, it is possible to see a bright side to what might appear at first to be an exceedingly gloomy picture. Granting of course that the cinematographers, directors and writers who have been active in this field approach these new-day problems with the technical and creative ingenuity the situation demands, one can even become downright optimistic in evaluating the future prospects of the business-film industry as a whole.

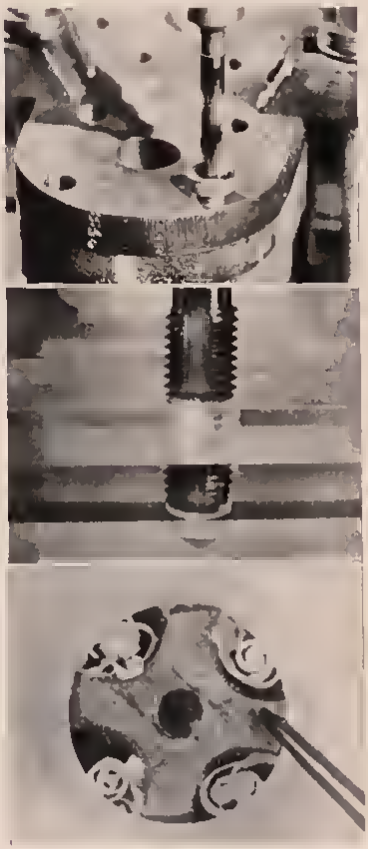
Of course we must face the fact that the conventional business film as we have known it—sales films aimed directly at the buying public, and sales-training films calculated to instruct salesmen in the best selling methods—is dead "for duration." And even though some business film units have been kept reasonably busy during recent months making institutional films, the number of these productions must surely decrease in proportion as the national effort mobilizes more completely for total war.

But for a number of years, those of us who have been active in building direct-16mm from a toy to a business institution have insisted very loudly that a properly-made 16mm business-film is the most potent way of conveying a message—and that it does not matter greatly what that message is. We've rather proven it by the impartial way 16mm. business-films have publicized almost everything from automobiles to safety-pins, and from dairies to cemeteries. We've also been rather insistent that 16mm. had the great advantage that its proponents had a new slant on things, and did not have to un-learn a lot of traditions inherited from a 35mm theatrical-film past.

Today, we have an opportunity to prove these contentions. If the first is true, what does it matter whether our "message" deals with the competitive merits of a particular brand of motor-cars—or with the "how-to do-it" facts vital to employees in some defense industry? If the second contention is true, and we *do* have a new slant on things, we can prove it by giving new life to instructional movies. We can find new ways—both technical and presentational—of making things clear to the people who see the picture.

That this can be done is already being proven by progressive business-film producers and technicians in several parts of the country. In Hollywood, Raphael G. Wolff recently produced a motion picture on arc welding which not only presents its subject very clearly, but sets a new standard of technical and creative presentation for subjects of this nature. First of all, Wolff—a distinguished specialist in the making of color stills for advertising purposes—utilized Kodachrome for making a film of a subject which might ordinarily be expected to be one for which black-and-white would be quite adequate—and more convenient.

The simple addition of color to this picture very definitely made it of greater instructional value. A black-and-white shot of arc welding makes very little distinction between the incandescent spot of the arc and the little pool of molten metal which forms the weld itself, or between the dark tone of the metal being welded and the ridge of slag which protects the cooling weld. In color, these technically important distinctions stand out with unmistakable clarity. There is



no mistaking the extent of the arc-flame, and no confusing it with the cherry red tones of the molten pool. The slag of the weld stands clearly apart from the welded metal.

New technical methods had to be worked out to make it possible to photograph this difficult subject successfully, without showing halation, and without sacrificing the balance of the picture to the incandescent spark of the arc. In the same way, completely professional animation—also in color—was called upon to show details which could not be shown by direct photography, such as the melting of the weld metal inside the electrode and the protective

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Controlling Color In Lighting 16MM. Kodachrome For Professional Pictures

By JAMES A. LARSEN, JR.

PRODUCTION of professional motion pictures in Kodachrome, either for direct 16mm commercial or educational use, or for enlargement to 35mm color for theatrical release, involves a number of factors which are not encountered in black and white production (in either 16mm or 35mm.) and which are by no means paralleled by the problems met in making 35mm theatrical films in Technicolor.

The first and most basic of these is the necessity for realizing that 16mm Kodachrome is a distinct medium in itself basically different from 35mm black-and-white or even 35mm color, but capable of equally serious use if approached in a seriously professional manner. Speaking generally, the majority of professional producers and technicians base their concepts of motion picture production upon their experience in 35mm black-and-white, and as regards color, with 35mm Technicolor. Many of them, unfortunately, are inclined to approach the use of 16mm with the attitude that since both 16mm and Kodachrome were introduced primarily for amateur use, and give adequate results in the hands of even comparatively inexperienced amateurs, they, as experienced professionals, can take 16mm in their stride. They fail to recognize the fact that to get consistently professional results with 16mm and Kodachrome, they must handle it in a consistently professional manner. They should study the new medium at least as carefully as though the Kodachrome film were of 35mm width and running through their Mitchell cameras, and adapt their techniques to the requirements of the medium in the same careful way they would if it were a new and unfamiliar 35mm. process.

The problems of exposing and lighting 16mm black-and-white are not too unlike those of exposing and lighting 35mm. black-and-white, allowing of course for the differences between the emulsions and processing methods involved. But in Kodachrome, these problems are considerably different, and more complex. The Kodachrome emulsion has much narrower latitude than does any black-and-white emulsion, and the laboratory processing affords considerably less control than is possible in black-and-white or in 35mm color.

One of the biggest points of difference between Kodachrome and black-and-white is the necessarily much lower sensitivity or speed of the Kodachrome emulsion, which means that under all conditions, much more light is required to give a satisfactory exposure in Kodachrome than in black-and-white. This is of course true of any color process; theatrical technicians are already familiar with this aspect of Technicolor, and I believe that some of the Hollywood studios which have made use of 16mm Kodachrome for pre-production tests have found that in practice the speed of the "Type A" used for interior photography is approximately on a par with that of the three-strip Technicolor process. However, lighting Kodachrome is a very different thing from lighting Technicolor.

Color balancing artificial light and daylight is often a problem in Kodachrome location-work

In any color process, not only are the direction and intensity of the lighting important, but also the color of the light. Lack of recognition of this fact probably accounts for most of the unsatisfactory results which Kodachrome has given in the hands of studio professionals and 16mm commercial cameramen, to say nothing of amateurs.

In any system of natural-color photography, the pictured rendition of colors will inevitably be influenced not only by the actual colors themselves, but by the color of the light falling on them. What we term a true rendition of colors means necessarily an exact reproduction of their visual appearance under what we consider normally colorless light—*i.e.*, normal daylight, which is theoretically defined as a blending of light-rays of all the spectral colors, so blended that we are not conscious of any color in it.

As a matter of actual fact, however, the proportion of light of different colors which reaches the earth from the sun varies throughout the day. The radiation of the sun itself is uniform, but the light which actually reaches us has to pass first through the earth's atmosphere, which acts like an enormous filter. The density and coloring of this filter vary according to weather conditions, and according to the angle at which the sun's rays strike it. Air full of moisture and dust (whether visible or not) has more of a filtering effect than dry, clean air. Similarly, the rays of the sun which reach the earth through a great thickness of this blanket of atmosphere—as is the case in early morning and late afternoon, when the sunlight strikes at a slanting angle—are filtered much more than the rays which reach the earth in the middle of the day. When the sun is relatively high in the sky, virtually the whole spectrum passes through; but when the sun is near the horizon, the rays pass through a much longer path of atmosphere, which holds back much of the blue and green light, and passes the yellow, orange and red rays strongly. An excess of dust or moisture in the air accentuates this.

Despite this minute-to-minute variation in the color of the light reaching the earth, there is usually a period of several hours during the middle of the day when the coloring of sunlight is essentially constant and "normal." The color-sensitivity and filtering of the Technicolor process has been balanced to this normal standard of illumination. So, too, has that of the regular or "daylight" Kodachrome film used for exterior shooting. Exposed to light of, or reasonably close to this "normal" color quality, the film will give proper color reproduction.

But if "daylight" Kodachrome is exposed to light of any other color-quality, it will not give absolutely accurate color reproduction. The degree of inaccuracy depends, of course, on the degree the coloring of the light varies from the midday "normal." It is for this reason that the Eastman Kodak Co. warns users of Kodachrome not to expose it within two or three hours after sunrise, or two or three hours before sunset.

But in commercial production it may sometimes be necessary to shoot during these off-color periods, even though normal color-rendition is demanded in the final film. In such instances, it is possible to use color-correcting filters, such

as are made by Eastman for use with their Color Temperature Meter, and by Harrison and Harrison for use with their Color-Meter. Essentially, these meters tell the cinematographer which of a matched set of color-correcting filters should be used to compensate for light of an abnormal color.

Because quite a bit of skill and a good deal of practice are required to use these meters successfully, I would recommend them only to the more painstaking professionals and to the seriously advanced amateur.

Daylight Kodachrome is balanced primarily for photographing subjects in full sunlight. If the subject is in the shade, and lighted by a clear, blue sky (but no direct sunlight) the resulting picture is likely to have a definitely bluish cast. The same thing happens when the sky is hazy. On a day so overcast that no direct sunlight gets through, the color quality of the light may sometimes be bluish, and sometimes a definite reddish, depending on the conditions of the overcast, and these tones—even though invisible to the eye—will be recorded in the Kodachrome scene. In looking at an actual scene under such conditions, our minds subjectively compensate for these slight differences in color-quality; we fool ourselves into seeing the objects in what we know to be their normal color. The color film does not have this automatic mental compensation, so it records the colors of the scene as they actually are.

For perfectly accurate color reproduction in Kodachrome, the subject should be in full sunlight and should be photographed at times and under weather-conditions when the sun has essentially constant color characteristics. For shooting close-ups in sunlight, some means of softening the shadows should certainly be used, and if possible, some means of softening the direct sunlight without changing its color, as well. If reflectors are used, the color-temperature or quality of the reflecting surface should be carefully chosen so that it does not upset the normal color balance of the lighting. The reflector should reflect all colors as nearly equally as possible. White is the only color which does this. The familiar silver-surfaced reflectors so often used professionally tend to reflect a disproportionately strong portion of blue light, while the gold foil reflectors so often used by professionals in black-and-white should certainly never be used in Kodachrome because they give the picture as strongly yellowish cast as though the scene had been photographed through a deep yellow filter.

Professional units which can take their own portable generators on location with them can simplify this outdoor light-balancing problem by the same method used in Technicolor employing color-corrected arcs of the same type used in Technicolor lighting as booster lights.

Color-reflection from surrounding objects is another source of trouble in making color exteriors by any process. If the subject is positioned near a large colored reflecting surface, such as the wall of a building, the whole scene may take on a tint of the same color as that of the reflecting surface. Unless such effects are purposely desired for an emotional or story reason, they should be avoided by more careful placement of the subject.

Compensation must often be made for the changing color temperature of natural light when professionally accurate color reproduction is desired

The foregoing may be summarized briefly into three simple rules: 1, If you want the best color reproduction possible from daylight Kodachrome, shoot only when the subject is in the sun and the day is clear. 2, Do not attempt to shoot too early in the morning, or too late in the afternoon. 3, Light the subject flatly, using diffusers, reflectors or booster lamps which do not introduce any light not matched to the daylight standard.

Important as the color quality of lighting is in Kodachrome production, it is no more important or critical than the quantity required to produce a correct exposure, for this, too, influences color reproduction. Assuming that the exact exposure for correct color reproduction has been determined, an increase or decrease of only 50% in the quantity of light reaching the film will upset the true color reproduction to a noticeable degree. An error of 100% will destroy the color balance to the extent that the scene will not be acceptable in professional production. A mild underexposure will increase the color-saturation of the image, making the colors exaggeratedly bright. A greater underexposure will badly accentuate the colors at the red end of the spectrum. A mild overexposure will soften the colors, rendering all colors more as pastel shades. A bad overexposure will "wash out" most colors, and usually somewhat accentuate the blue end of the spectrum.

The primary interest of the professional cinematographer is naturally to expose his Kodachrome original in such a way that he will get a faithful reproduction of color in the duplicates made as release-prints from that original rather than in the original itself. Speaking generally, this means a correct exposure, just sufficiently on the full side to aid in softening the increases in contrast and color-saturation which are inevitable in most duping processes.

With an emulsion of such limited latitude as Kodachrome, the determination of correct exposure should certainly be entrusted to a dependable photoelectric exposure-meter which measures *all* the light falling on the subject. While the author has used reflection-type exposure-meters as made by both Weston and General Electric for years, and with uniformly good results, his most recent experience has given definite proof that for professional production in Kodachrome by far the best exposure-meter now available is the Norwood which, outdoors as well as under artificial lighting, makes a reading of incident rather than reflected light and employs a hemispherical collector over the photocell so that it accurately evaluates *all* the light reaching the subject, making due allowance as well for the angle at which the light strikes the subject.

Interior lighting in professional 16mm. Kodachrome is entirely different from professional lighting practice for either 35mm. black-and-white or Technicolor. The color-temperature of the lighting is even more important in Kodachrome interiors than it is in exteriors, for a special type of Kodachrome is used. Known as "Type A," this emulsion is color-balanced to incandescent lighting of a specific color-temperature. It will give absolutely unusable results if used with either the lighting used for professional black-and-white, or that used for Technicolor.

The most important single factor in-

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The Indians Had A Word For Us

By EDUARD BUCKMAN

In technical dependence upon Douglas Sinclair, co-directing cinematographer

"MUSSON-AB-SKI-GA-GOG" was the word the Cree Indians had for us at the time. And we were assured, once we'd left the James Bay area, they'd change it to "Kam-musson-ab-ski-gay," and would thereafter use that imposing Cree mouthful whenever they referred to us. But we weren't worrying about either what they did or would call us. Our worries were much closer to our daily life and work. Naturally the Indian title reflected these. We, the "musson-ab-ski-ga-gog," *those who take pictures*, were faced with so many problems that we wondered if, when we did get back to civilization, we mightn't have nicely qualified for the "Kam-musson-ab-ski-gay" title, which translates: *those who have taken pictures!*

Almost as soon as we reached the North we had some of our most anxious moments—our first and major trial.

The camera was running in a cooking pan and made a swishing sound with a metallic echo. The light in the room was coldly pale, as if it reflected the muted gurglings of the Cine-Special. The light was pale because it came through an inch of hoar frost on the window-panes. The room was *cold*. The cameraman wore his dressing-gown over his clothes as he bent attentively above the pan, watching the clear liquid turn dark as the oil worked out of the camera.

"It's just about right now," he commented, much as if the pan contained a cake which had reached baking perfection.

"I hope so," I answered. "I don't relish the idea of freezing up here and then having nothing to show for it when we get back to civilization."

"Coal-oil is the only thing," the cameraman was saying solemnly, as if I hadn't heard the process explained before. "Just let your camera run in it—with the lenses off, of course. Just let it run until every drop of oil is washed out. Then no temperature will slow it up. You saw how the Eyemo behaved, and I'd treated it with the coal-oil before we got up here. I'll do the same for the Cine-Special now, though I don't much like to—it's a complicated piece of machinery. But what else can I do?"

"It wasn't working anyway. You can't make it any worse than that, no matter what you do or don't do to it."

"It's done now," the cameraman said. He lifted the camera from the pan and began to dry it with Kleenex.

The coal-oil bath was a direct outcome of the experience we were obtaining in making moving pictures under Arctic conditions. True, we weren't actually in the Arctic Circle—not by almost a thousand miles—but we might as well have been. Temperatures of thirty, forty and fifty-odd below zero are rarely bettered (or lowered) in the Arctic itself. We were working at Moose Factory, second oldest Hudson's Bay Company Post on the continent, two miles across the Moose River from Ontario's northermost railhead at Moosonee, and some ten miles up the river from James Bay. The assignment, given us late in November 1941 by John Grierson, Dominion Film Commissioner, for the National Film Board of Canada, was to make a film in 16mm. Kodachrome on trapping in the North. And in the process the cameraman was to take a number of stock-shots of Northern activities in general on 35mm. film, with an Eyemo.

We chose Moose Factory as the most likely fur country closest to our Ottawa Studio base. As far as location went, we chose well, but we went North quite unprepared for the difficulties of filming under sub-zero conditions. Everyone in Ottawa who had worked under Arctic conditions had given us advice, and we'd read what there was in the American Cinematographer Handbook. But it took the country itself to really teach us.

First, we'll pass on a non-technical maxim which should save a lot of technical misfortunes to him who will heed it: *You can control your camera and film, to a large extent, when they're in your hands; but when they're out of them they go to the dogs.*

Dog-team, of course, is the usual means of winter travel in the North. Dogs are not kind to cameras. They'll gnaw the leather cases, if they get the chance, when the cameras are not on the sleigh. And when the cameras are lashed with the sleigh's load under the tarpaulin cover, the dogs can do far worse!

We didn't risk our three 16mm. cameras on our maiden dog-team voyage. I use the phrase advisedly. When we reached Moosonee there was an unexpected thaw in progress, and the river,

not then completely frozen over, was running with water on what ice there was. The Hudson's Bay Company's manager suggested we leave our cameras at Moosonee on the mainland—we ourselves were apparently far less valuable in his eyes.

As we crossed the river, avoiding the open V-shaped channel in the middle, the dogs floundered like porpoises and the sleigh left a wake like a ship. The cameraman was shooting Eyemo material. The river-heaved ice looked more Arctic than the Arctic, and the thaw made the "bergs" all the more brilliantly photogenic. The water on the ice didn't show in the pictures, some of which appeared in the "Forward Commandos" issue of the "Canada Carries On" series, and looked appropriately desolate, Northern and frigid.

The Manager sat sideways on the sleigh, ready to jump. The cameraman must have clung on with his legs—his hands were busy with the Eyemo. As for myself, I only know I held the Eyemo case and kept supplying, at incredibly short intervals, fresh rolls of film. We'd have had a Northernly cold christening if the ice had given way! But it didn't, and we reached Moose Factory intact.

In a day or two everything was frozen solid again. I went over to Moosonee alone for the 16mm. cameras. My co-directing cameraman wasn't stirring out of doors. Not because his dog-team experience had given him cold feet (in any sense), but because he had a swollen face from an aching tooth, and the doctor prescribed heat from hot water bottles, not cold from windswept ice wastes.

At Moosonee a miscellaneous cargo of Christmas goods and a kitchen range awaited the eighteen-foot sleigh. The Indian driver thought the camera-cases would be safest between two large packing-boxes near the front; and I felt quite satisfied, too, once they were lashed under the tarpaulins. True, I'd seen the same sleigh upset on a curve at Moosonee; but then it had only had two packing cases on it, and I'd imagined it went over because the load was light. Now with the present impedimenta, especially the stove (like a gun-turret at the rear), I felt it was safely stable.

"Whitt! Hwitt!" the Indian shouted the straight-ahead driving call of the Bay, and the dogs tore down the river bank—a steep thirty-foot descent, at the bottom of which tides had raised a ridge of ice. The sleigh skidded, and, despite the braking efforts of driver, slithered sideways against the ridge, where it capsized. The Indians just laughed as they righted the sleigh. After that our trip was uneventful.

The casual way the Indians had treated the upset and our apparent careful stowing of the cameras made me think no harm could have been done. I didn't bother mentioning the incident to my co-worker.

But the next day, out on the ice, a half mile from the Post, with the biting wind peppering us with dry, stinging snow, I knew something *had* happened to the cameras. The cameraman told me so, plainly, profanely. The speed was wrong. I said that was probably because the day was extra cold. Then the shutter stuck. The cameraman replied that wasn't just the cold, not by a — — —!

Until you've photographed continuously in real sub-zero weather you can't even approximate an adequate idea of just how cold the metal of a camera can get. Not for a single moment can it be touched with bare hands without a sensation sharper than a burn. Usually the cameraman wore thin cloth gloves so that he could make focusing and other adjustments and be protected from the cold metal. But when the shutter stuck, adjustments became too delicate. He had to take off the thin gloves.

Fortunately, his heavy gauntlets hung at his side. In the Bay area duffle-lined (duffle is wool cloth thicker and softer than heavy blanketing), moose-hide gauntlets are worn. Each has a moose-hide loop at the top of its beaded, fur-edged cuff; and through these passes a gaily plaited cord of yarn with tassels. The tassels are pure decoration, the cord pure necessity. It holds the gauntlets on you wherever you happen to be. Forty—even thirty, twenty or ten—below zero is much too cold to casually toss gloves down on the snow. By the time you're ready to put them on, your hands may be starting to freeze; and if you've to grope around in a snow-drift, they'd be frozen white. But with mitts on a string around your neck, all you have to do (if you don't get the strings mixed and try to put on your exposure meter) is to fumble benumbed hands into duffle linings and pray they will get warm again. And this is what the cameraman kept doing until he'd somehow managed to finish the hundred-foot reel, even with the Special behaving as it was. Then we left the ice for our lodgings.

It was relatively comfortable (at least by comparison with outside temperatures) in the big kitchen. Once his hands were warm enough, the cameraman went to work on the Cine-Special. All he had to work with was an assortment of Mr. Woolworth's least expensive screwdrivers and pliers, plus some match sticks. Here we were—miles from a camera repair shop, and only one train in and one out each week—with a shutter mechanism badly out of alignment and a film to finish! But the cameraman effected a major repair job with the scanty tools he had. He got the Special's shutter working, and after the coal-oil immersion, the speed worked, too.

We didn't only learn about what cameras could do in the North. We learned likewise how film behaved. Both have something in common. For cameras and film (exposed and unexposed) had always to be kept at what scientists, I believe, appropriately refer to as the

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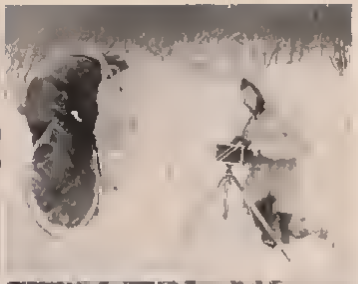

On opposite page: Cinematographer Douglas Sinclair films the beaver-trapping sequence in a snowstorm. Above, left, cameraman Sinclair and the author iron out a script problem on location. Right: top to bottom: finishing the beaver sequence; dog team travel, trapper arriving at trading post in scene from "Fur Country"; interior showing mixture of daylight and battery powered Photofloods. Photos Courtesy National Film Board of Canada.

Aces of the Camera XX:

Rudy Maté, A.S.C.

By WALTER BLANCHARD

A STUDIO publicist once described Rudy Maté, A S C as "the shyest man in Hollywood" Publicity-men being what they are, that's undoubtedly an overstatement but there's no doubt that the soft-spoken, mild man named Rudy is as different as possible from the dashing extroverts fiction-writers like to characterize as cameramen But that's quite logical, too, for fictional cameramen seem always to be made to appear as hard-boiled technicians, with nothing of the artist even hinted about themselves or their work And Rudy Maté is an artist to his fingertips Half-a-dozen Academy Award nominations testify to that!

As a matter of fact, Rudy Maté had no intention of becoming a cinematographer in the first place, both the profession and the career were thrust upon him by force of circumstances But once started, he climbed the cinematographic ladder with a rapidity that would seem absolutely incredible today He made his way to the top in Europe —and stayed at the top; when he came to this country ten or twelve years ago, his artistry as quickly won him high ranking here, as well But to tell the truth, he probably took less pride in the fact that last year his professional skill put two of his pictures in the Academy Award Nominees' listing than in the fact that he became a citizen of the U S.A

Mate's background was in one way the least likely preparation imaginable for a cinematographic career—and in other ways, perhaps the most perfect Here's how it happened Rudy was born some forty-four years ago in Cracow, Poland His father was a prosperous citizen of what is now Jugo-Slavia, and young Rudy's upbringing was typical of that of any son of Europe's educated classes The period immediately following the close of World War I found Rudy at the University in Budapest, studying philosophy, with particular attention to the history of Art

Then came the post-war depression, and one morning Rudy learned that he must start immediately to make a living for himself Immediately, he went after a job—he wasn't particular what, so long as it brought him a few pengoes a week and half a chance for advancement By luck, that first job was as a highly unskilled helper in the laboratory of a Budapest motion picture studio It was hardly the sort of work you'd expect to find a budding philosopher doing It wasn't a "white-collar" job at all, just work—sometimes messy and always hard But Rudy went at it with a will I don't know if, like the Lord High Admiral in "Pinafore," he "cleaned the windows," but he certainly swept the floor, cleaned developing-tanks, carried film about, and helped load the developing-racks and mix solutions Being of an inquiring mind, he made it a point to learn as much as possible of the why and wherefore of what he was doing And always he kept his eye alert for a better opening

One day it came. One of the studio's cinematographers, he learned, was looking for an assistant Figuratively, at least, Rudy took off his laboratory apron and told the cameraman not to look any farther—that he had already accepted the job!

So young Maté went out on the set as an assistant—for one picture He carried the camera and held the scene-slate, and made himself as nearly useful as a raw, green assistant could be in those silent picture days And he kept his studious eyes open every second, and his mind absorbed everything he saw his chief do When the picture was completed, Rudy decided he was ready to strike out boldly for a better job

So he went to Vienna, where he knew they also made pictures—and on a larger scale than they had in Budapest. In Vienna, he found a producer who was looking for a cameraman Rudy calmly informed him that *he* was a cameraman from Budapest, and would be glad to photograph the picture "I didn't think it was necessary," says Rudy, "to

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THROUGH the EDITOR'S FINDER

IT HAPPENED recently in one of our most major studios—there's no point in saying which one, for we've seen the same thing happen again and again in all of them. And it shouldn't. A certain star made a picture in Technicolor; it was a fine job photographically, and everyone from the Head Man down gave out with raves about what a particularly great cameraman the man who photographed it was.

In due time, that star made another picture—this time in black-and-white. Of course she asked for the cinematographer who had made her so glamorous in her previous production. Equally of course, she got him, and the picture went into production. But after the first few days' work, some of the executives (and perhaps the lady herself) began to ask plaintive questions—why couldn't so-and-so, who had made her look so lovely in her last picture, make her look equally glamorous in this one? As the days went on, that spirit of dissatisfaction (aided, maybe, by surreptitious screenings of pet shots from the previous effort) grew like a rolling snowball, until the various Mr Bigs had gotten themselves quite convinced that so-and-so wasn't as great a cameraman as they had thought he was. So they took him off the picture, and put somebody else on. The same thing happened with him: he couldn't equal the way the lady had been photographed in her previous picture, and he, too, was replaced. Sometimes this chain of events lasts through the whole of a picture, and places most of the studio's camera staff on the picture (and the spot) for a few days. In the end, the picture gets finished, and the critics surprise everybody by remarking on how lovely Miss Blank looks!

Now, it's entirely possible that any cameraman—no matter how great—can miss in photographing a star. But in this instance, we don't think it was the cameraman's fault, but the fault of the short-sighted executives who made the mistake of attempting to judge their star's appearance in black-and-white by the way she had previously appeared in color. Actually, no such comparison is possible, or fair; even in the rawest amateur's cine-snapshooting, *any* girl will look better in a color shot than she will in black-and-white. With a skilled professional lavishing the glamorizing resources of Technicolor on a star, she's bound to look better than he *or any other cameraman* can make her look in black-and-white. The softer lightings possible in Technicolor tend to conceal the lines, wrinkles and under-eye bags so many of our longer-established stars have, while the same lighting in black-and-white would be objectionably flat and "mushy." In addition, the simple fact of color lends an added, glamorizing dimension that can never be obtained in even the best black-and-white.

We'd like to suggest that in a case like this it would be a great deal more fair—and much easier on the dispositions and nerves of all concerned—if instead of using the star's previous, Technicolored appearance as a yardstick by which to judge, one used her last previous appearance *in a black-and-white picture* as the standard by which to judge present performance. Then, making a direct comparison between black-and-white and black-and-white, the two camera performances could be judged more nearly on their own merits, instead of tipping the scales by adding the unequal comparison between black-and-white and color, in which color always wins!

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AMERICA, under the pinch of war time pressure, is "discovering" the motion picture all over again—not merely as a superlative agency of mass entertainment, but as an educational and socially instructive implement beyond parallel. Not too long ago, we used to laugh tolerantly at the Russians, the Germans, and others who made much of the movie as an instrument of propaganda. Today, we're learning that they were right . . . and learning, too, how to carry the essential messages of democracy to our own people, and to the peoples of our allies and our neutral neighbors, by the powerful voice of the motions picture. Some of our greatest creators, like Major Frank Capra and Major William Wyler, are already in the Government service, making movies for these purposes. Others will follow.

But there's a bottleneck—a serious one—in this process. All too few of the nation's top-ranking cinematographers are eligible to don the uniform of the nation's armed forces as Frank Capra, John Ford, William Wyler, and others have done. Age, health and family responsibilities tend to keep many of them civilians, no matter how much they'd like to become active members of the armed forces.

Yet many of the films now planned not merely need, but absolutely require the services of the industry's greatest cinematographers, if they're to tell their message with full effectiveness.

In view of this, there's much to be proud of in the arrangement worked out between Major Capra, the officials of the A.S.C., and the executives of our major studios, by which the "ace" cinematographers so urgently needed for these vital productions may volunteer their services as unpaid, civilian volunteers, doing their skilled bit to help their country. Briefly, the arrangement is this: a large percentage of our best Directors of Photography are under contract to the major studios, the annual term averaging forty weeks, leaving a twelve-week period during which, at the studio's option, the cinematographer may be off payroll. Arrangements have been perfected so that an A.S.C.-member may volunteer to make a picture for the Government during part of this period—say, two weeks or more—which the studio will apply as part of his annual layoff-period. During this time, the cinematographer will donate his skill to the War Effort as a volunteer, with his expenses (but no salary) paid by the Government agency involved. Should the production in question extend beyond this time, if he is in the clear with his studio's production needs, he will of course complete the production, if his studio needs him, a second volunteer of equal professional standing may take over the assignment, and, if necessary, be followed by a third and a fourth until the project is complete. Free-lance cinematographers are arranging to contribute their efforts similarly.

We can't help feeling a surge of pride at the response already accorded this plan both by the executives of the studios, and by the cinematographers themselves. The needs are so great that the services of virtually every member of the A.S.C. will ultimately be required, as the production-schedules involved permit: by the response so far received—though by no means complete—indicates that Uncle Sam's Army, Air Force, Navy and Marine Corps will be assured of top camera-talent for the filming of their key productions.

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DURING these last few weeks, we've been more than a little irked by the implications made by one of our leading national weeklies which has charged the administration with conducting a "Hollywood war," meaning, we gather, a war conducted more by publicity than by sincere, shirtsleeve workers. As to the war itself, all we know is what we read in the papers; but as regards Hollywood, we'd like to invite the writers of those editorials to come out here and meet the Hollywood we know—the Hollywood represented by the members of the A.S.C. and the other technical and creative groups of the industry. No other community or industry, we're sure, can offer any better example of sincere, hard-working ability!

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FROM time to time we have the pleasure of meeting readers of THE AMERICAN CINEMATOGRAPHER and learning from them just how their magazine helps them make better pictures, whether as professionals or amateurs. It's very gratifying to have them tell us they consider the information in this journal the best and most authoritative, and that they rely on it implicitly in shooting their pictures. But at the same time, things like that make us feel a great sense of responsibility, which we hope we may never outgrow or disappoint.

A.S.C. on Parade

Vern Walker, A.S.C., RKO's big yacht and trick-shot man who some time ago volunteered the services of his boat and himself to the Coast Guard's volunteer coastal patrol has been promoted to Vice-Commander of his unit, officially Coast Guard Volunteer Flotilla 23. Nice work, Skipper!

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James Wong Howe, A.S.C., is in a unique quandary, with offers of a commission, so we understand, from no less than three military organizations—the photographic sections of the U S Army, the U S Navy, and the Chinese Army. Meantime, he's very busy, thank you, having just finished Warner's hard-luck picture, "The Hard Way," and immediately starting their $2,000,000 air-war special, "Air Force," which will keep Jimmie plentifully tied up for the next two or three months glorifying Uncle Sam's War Birds, with unprecedented cooperation from the Air Force.

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"Air Force," incidentally, had been scheduled for **"Tony" Gaudio, A.S.C.,** up to the time his recent appendectomy gave him an enforced vacation. Everyone will be glad to know that the popular **"Tony"** is now out of the hospital and well on the road to complete recovery. **"Tony,"** on his part, is beaming over the way his pal **Jimmie Van Trees, A.S.C.,** is earning executive bouquets for his work on "You Can't Escape Forever," which he took over on short notice when **"Tony"** was rushed to the hospital.

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Over at Columbia, **George Meehan, A.S.C.,** gets the honor of directing the photography of that studio's first Technicolor effort, "The Desperados." Knowing what **George** can do on even a program "Western" in black-an-white, we're looking forward to seeing his performance on this Technicolor special. Looks like one case where "let **George** do it" is a good policy!

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Karl Freund, A.S.C., has moved to his new ranch in the San Fernando valley, and says he loves the simple life out there among the cows and chickens. **Karl** steadfastly denies implications that he bought a chicken-ranch to assure himself a supply of eggshells to make the domes of his favorite "Norwood" meters. For the next several weeks, anyway, he'll be busy with quite another type of chickens (non-feathered, Culver City variety) as MGM has assigned him to glamorize their big musical, "Du Barry Was A Lady."

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Lee Garmes, A.S.C., says one reason why he bought his present house was that there's a public mail-box right in front of his home—perfect insurance against forgetting to mail a letter for the better half!

Charles Lang, A.S.C., watching with quiet amusement as director Mitch Leisen does a regular Abbott and Costello routine when he gets tangled in the camera-tape between scenes of "No Time for Love."

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Bob Planck, A.S.C., draws the assignment to "Reunion" at MGM, while **Bill Daniels, A.S.C.,** does likewise on "Keeper of the Flame." There'd be a photographic treat for any double-bill!

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Paul Ivano, A.S.C., goes out to Monogram to toss shadows around for their horrific, "The Isle of Terror."

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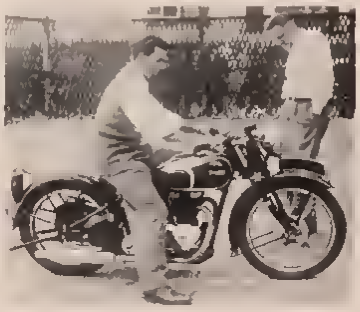
Leo Tover, A.S.C., goes solo Technicolor-wise filming "Star Spangled Rhythm," for Paramount.



Add rubber-savers: **Fred Jackman, Jr., A.S.C.** Notice the surprise of his dad, **A.S.C.-Prexy Fred Jackman, Sr.,** when **Fred, Jr.,** rolled into the A S C parking lot on a shiny new lightweight motor bike instead of the usual big Chrysler!

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With the recently-completed "Eagle Squadron" eliciting all sorts of critical compliments, **Stanley Cortez, A.S.C.,** goes right back to Universal (on loan from David O. Selznick Productions) to photograph Charles Boyer's first producing venture, "Flesh and Fantasy."

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A last-minute switch in assignments puts **Rudy Maté, A.S.C.,** instead of **William Mellor, A.S.C.,** on Bob Hope's "They Got Me Covered" for Sam Goldwyn, while **Billy** goes over to Columbia for Lester Cowan's "The Commandos Come At Dawn," incidentally drawing a location trip to British Columbia just at the time a lot of us wish we had the time (and the tires!) to go a-vacationing there.

•

Harry Wild, A.S.C., and **"Duke" Greene, A.S.C.,** back from their long trek to Brazil with Orson Welles. They report Brazil a great place to visit, but they prefer Hollywood for picture-making . . . Maybe they just didn't learn the right words in Portuguese!

Silas E. Snyder

WITH profound regret we chronicle the passing of Silas Edgar Snyder, Editor of **The American Cinematographer** from 1921 to 1922 and again from 1927 to 1929, who died July 13th after a four-year illness. Active as well in the conduct of other phototechnical publications in the industry, "Si" Snyder was known and loved by every member of the camera profession.

When he came to this magazine after a long and successful career as a journalist and motion picture publicist, he found it a shaky little semi-monthly newspaper which hardly justified even the term "house organ." When he left it, he had built it into a substantial technical monthly well on its way to becoming the world's foremost motion picture technical publication. It is not too much to say that without "Si" Snyder's guiding hand during its formative days, **The American Cinematographer** might probably have died before getting well started.

But it is not so much for what he did that "Si" Snyder will be remembered, but for what he was. Kindly, chivalrous, loyal, "Si" Snyder was in the best sense of the term, a fine gentleman of the old school. Never in word or deed would he do anything intentionally to hurt a fellow being, and his own warm greeting and courtly manner when you entered his office made you feel he felt himself genuinely honored by your visit. His loyalty was unswerving; President Fred Jackman tells of an incident in the early days of the A.S.C. when it was discovered that if Snyder's salary were paid that week, the rent could not be, and Snyder unhesitatingly replied, "That's all right, Fred, pay the rent of course," though he needed the money himself.

Yes, "Si" Snyder will be remembered, and mourned. Though his old-world manner and ideals may have fit ill with these latter days of speed and high pressure, they made all who knew him feel just a bit better for knowing that humanity could produce so fine a man.

Merritt B. Gerstad, A.S.C., joins the Warner camera staff, filming "The Watch On The Rhine."

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With **Ted Tetzlaff, A.S.C.,** directing the photography of the Fred Astaire-Rita Hayworth picture "You Were Never Lovelier," we'd say the title was uncommonly appropriate.

PHOTOGRAPHY OF THE MONTH

THE PRIDE OF THE YANKEES

Samuel Goldwyn Production; RKO Release

Director of Photography: **Rudy Mate, A.S.C.**

Special Photographic Effects by **Ray Binger, A.S.C., and Jack Cosgrove.**

Photographically, as well as in every other department, "Pride of the Yankees" is without doubt the finest picture we've seen since "How Green Was My Valley." Though centering around a baseball-player, it is not a baseball picture in the usual sense; all of the baseball sequences could be eliminated, and "Pride of the Yankees" would still be an outstanding picture. Yet the handling of the baseball action ranks with the best ever screened.

You really ought to see the picture twice to appreciate how nearly flawless a job of camerawork Mate has done. Every detail of photography and lighting are perfectly keyed to the mood of the action, but they are kept tactfully in the background. Yet on analysis you'll find that Mate's camera unobtrusively does a great deal to heighten not only the dramatic strength of the story, but also the fine performances of the cast.

Mate in this picture does something only rarely seen on the screen, yet which ought to be an integral part of all dramatic cinematography. The dominant mood of the picture is simple realism. Therefore Mate begins the picture in a simple, realistic style of camerawork—almost commonplace as first you look at it. But from this simple start, he builds the photographic mood slowly, subtly, almost imperceptibly, until when the climaxing sequences of the picture come—especially the final "Lou Gehrig day" scenes—Mate's camera-treatment rises to a visual crescendo which aids immeasurably in arousing an emotional response. The long-shot down the long, bare tunnel from locker-room to field, when Gehrig and his wife stand there before he goes out to receive the last homage of the packed stadium, is one of the most poignantly moving pieces of photography this writer has ever seen on the screen. It is in itself enough to bring a tear to the most hardened eye.

The transition in photographic treatment from strict realism to a building mood begins in the sequence where Gehrig and his sweetheart first hear "Always" sung in the night-club, and watch Veloz and Yolanda dance. There, for the first time, Mate has an opportunity to play deliberately for pictorial effect, and his lightings and compositions (especially in the very interesting compositions while the song is sung) have an unusual blend of pictorially arresting quality and realism. From this point onward, Maté's visual treatment never lets down, but builds consistently to the climax.

His treatment of the players is characteristically fine, especially in the case of Gary Cooper, who sheds many years in the sequences of Gehrig as a youth. Mate has also succeeded in bringing baseball—notoriously one of the most difficult sports to photograph with dramatic effectiveness—to the screen with a perfection that will stand for a long time as a high water mark in the filming of this decidedly non-photogenic sport.

Indeed, there are but two flaws which this reviewer could detect in "Pride of the Yankees," both of them of an essentially minor nature. The first is the treatment of the interior sequence where Gehrig comes at midnight to propose to his sweetheart. Here, it struck me, Mate employed a slightly too heavy type of diffusion, which called attention to the mechanics of photography which had hitherto been kept perfectly subordinate. The other was the inclusion in the montage illustrating the ball team's travels, of a scene—apparently a stock-shot—made from the rear of a train with the camera at a slantwise angle. This lent a note of "artiness" which was badly out of key with the straightforward treatment of the rest of the picture.

The special-effects work of Ray Binger, A.S.C., and Jack Cosgrove is another highlight of the picture which should not be overlooked. Their work in the ball-park sequences is especially notable, since many of the scenes represented a blend of three or four or even more elements—the intimate action photographed in a Los Angeles ball-park, other portions filmed actually in the Yankee Stadium in New York, and often the skyline of New York or other cities processes in as a photographic multiple printing or as a matte-shot. Their work is in every way as perfect as that of Mate on the production camera.

The production design of William Cameron Menzies, the art direction of Perry Ferguson, and many of the other technical and artistic features of the film are also of such outstanding calibre as to make "Pride of the Yankees" in every way one of the great films of the year.

MRS. MINIVER

Metro-Goldwyn-Mayer Production

Director of Photography: **Joseph Ruttenberg, A.S.C.**

"Mrs Miniver" is another well-nigh flawless production in every department. The photographic conception of Joseph Ruttenberg, A.S.C., is different from that Rudy Mate had for "Pride of the Yankees," but no way less outstanding. Ruttenberg kept to a more pictorial mood, and in so doing made the grim effects of modern war on England's home front stand out in bolder contrast.

From start to finish, Ruttenberg's compositions and lightings command interest. They're very nearly flawless, and have an unusual blend of pictorial quality and strength. Such a treatment is singularly appropriate for a story like "Mrs. Miniver," for it visually epitomizes the qualities which have made such a heroic saga of real-life England under the blitz—a land of peaceful countrysides and quaint, sleepy villages, with peaceful little river backwaters like that upon which the Minivers' home lies—picturesque, and not too far removed from Dickens' England, yet when occasion demands, concealing a quiet strength that is amazing. Ruttenberg's camerawork reflects all this, and unquestionably plays a vital, if silent, role in making "Mrs. Miniver" one of the great pictures of the year.

The special-effects work throughout—but especially in the Dunkirk sequence—is exceptionally fine, though it seemed to us that the miniature of the warship in this sequence could have been somewhat improved. In this sequence especially we were impressed by the very great quality of the direction and script writing which characterizes the entire production. With all the technical and production resources of Hollywood to draw upon, and a central character taking active part in that amazing operation which achieved the militarily impossible and saved the B.E.F., most directors (to say nothing of producers and writers) would have shown Dunkirk on the screen in all its roaring excitement—and thereby lost the real dramatic thrill of something which was in reality too overpowering to put on the screen. Instead, we see "Clem Miniver's" boat leave its dock in the night and chug its way downstream toward an unknown assignment, steadily joined by more and yet more boats—pleasure-craft and commercial boats, large and small—until at last a mighty flotilla reaches its rendezvous at Ramsgate and heads into the open sea to rescue an army. Then, days later, we see the lone boat returning to its dock, battered and dirty, but its mission fulfilled. Almost entirely by visual means, supported only by natural sound-effects, truly creative direction, writing and great camerawork have made this one of the half-dozen most powerful sequences of its type that we've ever seen.

YANKEE DOODLE DANDY

Warner Bros.-First National Production

Director of Photography: **James Wong Howe, A.S.C.**

Special Effects by **Byron Haskin, A.S.C., and H. F. Koenekamp, A.S.C.**

"Yankee Doodle Dandy" is another of the season's outstanding pictures, and should be on everyone's "must" list. Photographically, it does not give cinematographer Howe exceptional opportunities for pictorialism, but he more than amply holds his own through the

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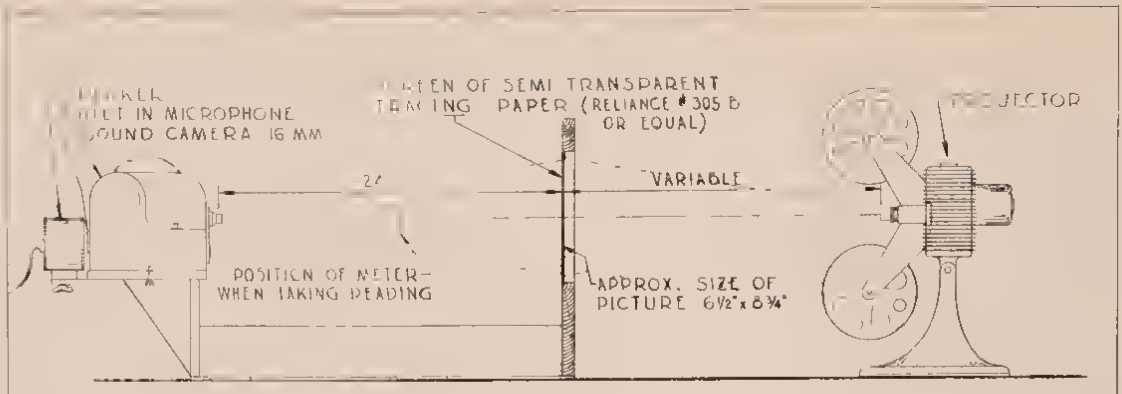

· BACK · PROJECTION · DIAGRAM ·

Back-Projection Tricks For Home Movie-Makers

By CLARENCE N. ALDRICH

Past President, Long Beach Cinema Club

THE professionals have a trick known as "back projection," in which the camera re-photographs a scene projected on a translucent screen behind the actors by an electrically-synchronized projector. They've got another neat little trick known as the optical printer, in which a camera re-photographs film passing through what is to all intents a lensless projector-movement, mechanically interlocked with the camera's movement, to make dissolves, "wipes", moving title-backgrounds, enlarging or reducing film, and so on.

Traditionally, these two professional tricks have been held to be beyond the range of amateur movie-makers, largely because we naturally lack the means of synchronizing our camera and projector movements.

But as a matter of strict fact, quite a few of the members of the Long Beach Cinema Club have been making successful use of non-synchronous back-projection in both 16mm and 8mm for some time! We've used it for reducing 16mm to 8mm, and enlarging 8mm to 16mm; we've used it for "duping" 16mm to 16mm, and 8mm to 8mm, and enlarging long-shots to closer angles, in either black-and-white or color, for adding sound to silent films by means of a single-system sound-camera; for making double exposed titles with moving backgrounds, and even in one instance for making an "insert" scene representing a picture being projected in a theatre. When a reasonable amount of care has been taken in doing the work, the results have been surprisingly satisfactory.

We've done it with just the sort of camera and projection equipment available to most amateurs, too. But there's no reason to believe that the basic idea wouldn't be practical for larger-scale shots—big enough to provide a projected background for at least fairly close angles with people in the foreground—if you had a higher-powered projector (like a Filmoarc) which would give enough light to illuminate a good-sized background screen. The screens, anyway, are already available—or were before priorities came along.

However, we've contented ourselves to work—and work successfully—on a smaller scale. The equipment I've used consists of a home made titler, a projector and camera, arranged as shown in the diagram. The more powerful your projector is, the better off you'll be, of course. When adding voice, I use the microphone built into the rear of my RCA sound-camera, and when adding music, I place a small loundspeaker behind this mike, reproducing phonograph-records played on my twin-turntable system. If you're handy electrically, there's no reason why you can't wire your disc reproducer right into the camera's amplifier, so you can eliminate the loudspeaker and combine music and narration.

The film to be projected can be either color or black-and white, and re-photo-

Left: Back-projecting an 8mm picture to 16mm and adding sound on film. Center: General layout of back projection set-up. Note loudspeaker behind camera for recording sound. Right: method of taking meter reading on back-projected scene.

Left. Black and white scene enlarged to close up and laterally reversed to show actor looking in right direction as he speaks title. Right. 8mm Kodachrome enlarged to 16mm Kodachrome and sound added

graphed with Type A Kodachrome or panchromatic film. If you're working in black-and-white, the faster the film you use in the camera, the better off you'll be, as it will minimize your exposure problems, and enable you to stop down for increased definition.

In 16mm., the film being back-projected should be turned over or reversed laterally, so that the projected picture will appear correctly on the screen. Since 8mm. has only one row of perforations, you can't do this in 8, but you can get the same effect by mounting either a right-angle prism or a front-surface mirror on the projector lens and projecting at right-angles to the camera-screen axis.

Be very sure the film is clean, and select a picture that has as little grain as possible.

The screen I've used is made of a piece of tracing-paper set in the easel of the titler. You can (or could, until priorities intervened) get small screens of the same cellulose acetate the professionals use for their work; but for this comparatively small-scale work, I've found tracing-paper does very well indeed.

If you look at the screen with your eye in the same position the camera's lens will occupy in shooting, you'll probably notice a "hot spot"—a circular area of greater intensity directly in line with the projector's lens. This "hot spot" will photograph as an area of slightly greater exposure than the rest of the picture. You can tone it down by careful application of white talcum-powder to your tracing-paper screen.

The projector should be in the sharpest possible focus, as viewed from the camera side of the screen. Be sure to focus the projector when the film is running through it.

You can determine your exposure by meter, taking the reading with the meter placed half-way between the camera and the screen. To avoid having the meter misled by the room-lighting, have all of the lights in the room turned off when taking your reading, and also when shooting the scene. Since some of the scenes projected may be light, and some dark, it's best to take an average reading, making readings on several different scenes—both dark ones, light ones and normal ones—and averaging up the several readings this gives you. Once you're accustomed to this process, of course, you can learn to "follow focus" on your exposure, opening up the lens for the darker srenes, and closing it down for the lighter ones. But until then, an averaged reading is pretty safe—and lots easier.

The big trick of the whole process is of course making sure that the shutters of your camera and projector don't synchronize "out of step," for if that happens, one shutter will be open while the other is closed, and your camera will

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Frame enlargement of scene made with cylinder distortion

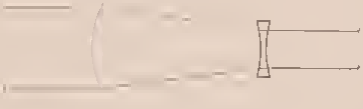
DIOPTERS—FOR DISTORTION!

By JOSEPH WALKER, A.S.C.

"DIOPTER" lenses—the inexpensive spectacle-lenses that can be picked up at the five-and-ten or at any spectacle-making shop—are familiar to most amateur cinematographers. They're useful as supplementary lenses to correct the focus of camera lenses for extreme close-up work, such as making titles or extreme full-screen close ups of flowers and insects.

But they've another use, too; in the proper combination, they can be used to produce deliberately distorted optical effects on the screen. This distortion can be either small or great, as the scene demands. It can be just a slight compression of a scene in one plane (either vertical or horizontal) with an accompanying spread in the other plane, in order to make a landscape composition fill the frame more pleasingly, or to give a close-up something of the lengthened perspective you see in fashion sketches and some of William Mortensen's still pictures. In this case, the distortion would probably pass unnoticed. Or it can be exaggerated for special effects, such as making a Boris Karloff like character more menacing, or adding either menace or grotesquerie to a nightmare sequence.

First of all, though, let's get started with a good understanding of what a "diopter" lens really is, and what it does. "Diopter" is simply the term used by opticians to designate the magnifying power of a spectacle-lens. One diopter is the reciprocal of a focal length of one meter, thus a 10 diopter (10 D) lens would have a focal length of 1/10 meter or 100mm. Diopter lenses are available both as positive lenses (rated as *plus* so many D) and negative lenses, rated as *minus* so many D.



GALILEAN TELESCOPE SYSTEM

For distortion, we make use of a somewhat more complicated supplementary lens set-up, using two cylindrical diopter lenses—one positive, and one negative—assembled like a simple Galilean telescope, as shown in the sketch. A plus diopter cylinder occupies the objective position, while a minus cylinder of greater power takes the place of the telescope eyepiece, and is placed as close as possible to the camera's lens. Both the axes and the focal points of the two cylinder lenses must coincide. The separation between the two should be equal to the difference in their focal lengths. The magnification produced may be determined by dividing the focal length of the plus lens by that of the minus lens.

From these facts, it is easy to calculate any type of system you want. Suppose you use a +10D cylinder for your plus lens, and a -20 D cylinder for your minus lens. The plus cylinder will have a focal length of 100mm, the minus cylinder will have a focal length of 50mm. The separation between the two should equal the focal length of the difference in their focal lengths, that is, 100mm—50mm., which equals 50mm. The magnification or distortion produced is equal to the focal length of the plus lens divided by that of the minus lens, in this case 100÷50, which equals 2.

Mounting a supplementary lens system like this presents some difficulty these days, since the tube that holds them should keep them accurately aligned, and yet permit adjusting the separation between the two, and also permit one of the lenses to be rotated with respect to the other, so that the final adjustments can be made with the device in position on the camera.

Ordinarily, a pair of metal tubes, one of which fits fairly snugly inside the other, would be the thing to use. But today, most metals are on priorities, and most machine-shops (other than home workshops) are likely to be busy on more important jobs than gadget building for amateurs. Luckily, though, spectacle-lenses are so light that you can get around priorities by using stiff cardboard tubing of appropriate diameter. This incidentally has the advantage of being light enough so the gadget can be mounted directly on the camera lens, rather than requiring a supporting arm extending from the tripod-head. In a mount like this, you can hold the spectacle-lenses in place either by using cardboard retaining-rings, which can be glued into place, or Scotch tape.

For long-shots, this system is complete in itself. But if you are going to use it making closer shots, you'll need to add a spherical auxiliary lens (*not* a cylinder lens as in the distorting system) in front of the plus cylinder to correct your focus. The focal length of this supplement should be equal to the distance between camera and subject: that is, if the subject is 6½ feet from the camera, use an auxiliary with a focal length of 2 meters—or a plus 0.50 D spectacle-lens—to refocus your optical system at 6½ feet.

The amount of distortion is determined by the overall power of the supplementary-lens system; for most purposes a set of these cylinder-distortion supplementaries ranging in magnifying power from 1.2 to 1.6 will prove satisfactory. More powerful units can be

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EXPLAINING "MONTAGE"

By LINWOOD G. DUNN, A.S.C.

MORE people—amateurs and professionals alike—talk knowingly about "montages" and the "montage technique," but actually know less about it, than about almost any other phase of movie-making. If you asked most of these people to define the term, you would either get a highly misleading answer, or reduce them to embarrassed silence.

Just to get myself out on that inviting limb, I'd define a montage as an assembly of comparatively short scenes, not necessarily related to each other in content, but which when viewed together serve to convey a definite story point or dramatic idea, and do it in less footage and more effectively than would be possible by conventional methods.

The word "montage" means assembly, anyway. It came into the language from the French by way of Moscow and Hollywood. Up to the start of World War I, the French were the top cinecraftsmen of the world. French cameramen and directors found their way into studios all over the world, and they took many of their technical terms with them. One of these was the verb "*monter*," meaning literally "to mount or assemble," which was their term for what we call cutting or editing. The act of editing film, and also the assembled film, was termed a "*montage*," literally, "assembly."

From 1914 to 1918 the French had other things to do than make pictures, and when the war was over, they never regained their dominant position in the film world. But they had left the imprint of their technical terms, especially in Europe's studios.

One of the places where French film-terminology persisted was in Russia, where a group of young directors headed by Sergei Eisenstein were beginning to turn out pictures which had a visual impact that startled the entire film world. These directors were making their pictures not only to entertain the Russian masses, but to educate them. They knew that a majority of the people who saw their pictures would be unable to read the subtitles, either because they could not read, or because they spoke one of the several hundred non-Russian languages and dialects used in the Soviet Republic. They knew, therefore, that they would have to make their pictures as visually telling as possible.

To that end they studied and analyzed the technique of the best silent pictures available—especially American ones. One principle they found was the use of a succession of quickly intercut scenes ("flashes," we called them) to get over a dramatic point in a minimum of footage and with maximum force. D. W. Griffith had used it even in his early pictures. So had many other American directors. A familiar and simple example would be the way in the old thrillers they used to intercut scenes of the heroine bound to the railroad track with quick, short shots of the onrushing train and perhaps other shots of the hero on his ride to the rescue.

Eisenstein and his associates took this idea and boiled it down to maximum strength, so to speak. They found that they could not only use this trick to deliver a dramatic punch, but often to tell in a comparatively few feet of film a rather involved idea or concept. But Eisenstein reduced these "flash cuts" to scenes far shorter than anything previously attempted. Instead of measuring these cuts in feet, he often measured them by frames. In his scripts one can frequently see the notation "27 frames long", "12 frames"; "6 frames in length." Some scenes might contain only three frames.

Very often, these sequences would follow a progressive pattern, repeating the same "flashes" several times in succession, but each time in shorter footage, so that the sequence built up a rising tempo, and often a very strong visual impact.

Eisenstein himself regarded this technique largely as a matter of cutting, so he naturally applied to it the term he commonly used for cutting—"*montage*."

When Eisenstein's pictures and his descriptions of his methods reached Hollywood, we took this technique up enthusiastically, using the same name as the Russians had used, and adding to it technical resources which we had but which the Russians apparently did not have, such as the superimposition of scenes by multiple exposure and optical printing. Today, the material for our montages is specially shot for the purpose, and then put together in the optical printer. Our montages are not always as short or bewildering as those early Russian ones were, but we can often use them to convey more complex ideas.

To make clear the difference between the original concept of a montage and the present one, let's see how two directors, one in early-day Moscow and the other in present-day Hollywood—might arrange a montage to convey the same basic idea, say the part a central character might play in the defense of Moscow last year.

Your Russian director might begin with a long-shot of the battle front, with the Nazi forces moving across the screen in attack, travelling from right to left. Then he would cut to a slightly shorter long-shot of the Russian defending line, with its guns firing, aimed, of course from the left to the right side of the frame. Then a head-on shot of his hero, firing his machine-gun. Then a much shorter flash of a Nazi tank—a flash of the hero—a flash of a Nazi infantryman throwing up his hands as the bullets felled him—flash (about a foot) of the hero—flash of the tank—flash (shorter yet) of the hero—flash of the German falling—flash of the flare from the hero's gun-muzzle—several flashes, short and from different angles, of falling Germans—flash of the gun-muzzle—flash of Germans turning back—flash of the hero, shooting—flash of Nazis in retreat—and a final, comparatively long close-up of the hero, at last ceasing fire.

Two frame enlargements from superimposed image montages. Above: close up of actors against black-velvet background superimposed on a long shot. Note how much better the upper part, 'doubled' against a flat background, is than the lower part which has a mere contrasty background. Below, insert of a newspaper headline double exposed against a long shot.

Your American director might handle the same montage this way. He would probably begin in very much the same manner, with two long-shots of the two contending forces, the Nazis advancing, the Russians opening fire. Then he, too, might cut to a head-on shot of his hero firing the machine-gun, followed by flashes of the tank advancing and Nazis falling. Then he would cut back to the head-on shot of his hero, holding it throughout all the rest of the montage, and over this he would superimpose a succession of "flash" shots of falling Nazis, the close-up of the gun-muzzle, the long-shot of the Nazis turning back, the gun muzzle again, and finally the Huns in full retreat, fading out this superimposition as the hero ceased firing.

There would probably be no great difference in the footage the two would employ, for while the Russian would use more cuts in his montage, they would be individually shorter, and the American's telescoped superimpositions would probably make use of somewhat longer

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Frame enlargement of a 16mm. scene filmed under water at Silver Springs, Florida

Making Movies Under Water

By THOMAS TUTWILER, A.S.C.

IF you're looking for new cinematic worlds to conquer, you can find one —literally—by taking your camera underwater. You've probably seen what the professionals have been doing along these lines in such pictures as the MGM "Tarzan" films and (in Technicolor) Paramount's "Bahama Passage" and "Reap the Wild Wind," to say nothing of a number of short-subjects. You can do the same thing in 16mm. and 8mm., even in Kodachrome, and get pictures that are really different from the ordinary run of home movies.

The first problem, of course, is how to get your camera under water without soaking it. There are plenty of ways to do this. For instance, if you should happen to be in Florida, you can make use of the same facilities the professionals used: the two underwater "camera boats" at Silver Springs, and the "hole in the water" at Wakulla Springs, which Lloyd Knechtel, A.S.C., described in THE AMERICAN CINEMATOGRAPHER about a year ago. Naturally, if you're an amateur shipwright and live on or near a river or lake where you can have a boat, you can build one of these cinematic submarines for yourself. All that's necessary is an open-topped box or tube big enough to contain the camera and cameraman and deep enough to get your lens six or eight feet below the surface. It can be built as a part of a full-sized boat, as in the Silver Springs submarines, or attached to a barge or diving-float as in Wakulla's "hole in the water."

In either case, it is sunk to the proper depth by ballasting with rocks or concrete blocks, and the camera shoots out into the water through a plate-glass window.

But this sort of construction is rather ambitious for all of us except the most ardent home-workshop addicts. A simpler way of getting underwater movies is to shoot your pictures in a swimming-pool from one of the glass-windowed observation ports which are being built into more and more private pools, and some public ones, as well.

Another way to do it is to build yourself a smaller "hole in the water," just big enough to hold your camera, while you work it from above. The gadget itself is of course simple enough—just a long, narrow box, open at one end and with a plate-glass window at one side of the bottom through which to shoot—but there are two ways of mounting your camera. One is to mount it at the top of the box, handily out in the open air, shooting down toward the bottom of the box, where a mirror reflects the image seen through the porthole up into the lens. This is handy, but unless you use an expensive and delicate front-surface mirror, you're likely to have trouble by getting a double image from the mirror—one reflected by the silvered reflecting surface, and a secondary image, slightly out of register, from the front surface of the glass.

A more practical idea is to put the camera down at the bottom of your tube, so that it shoots directly out through the port, and operate it by a simple remote-control lever. The problem here is sighting the shot when you're in a position where you can't use the regular finder. But this can be solved easily enough by making the porthole a bit bigger, and outlining on the glass at one side of the camera a rectangular field matched to the field of the camera, and reflected up to your eye by an inclined mirror. Since your tube may not be perfectly water-tight, it's a safe practice to mount your camera three or four inches above the bottom, so if any water seeps through, it will collect below the camera.

Finally, there's the possibility of putting both the camera and yourself into diving helmets, and getting your pictures that way. There seem to be quite a number of diving addicts in all parts of the country who have made themselves simple diving helmets—usually a properly-shaped end section from an old water-heater boiler, which fits snugly over their shoulders and receives air pumped down through a hose, while they look out at the underwater landscape through a glass window in the front of the helmet.

If you can borrow or make one of these outfits, you'll find there's a lot of fun in going down yourself and shooting your pictures with the camera in an underwater diving-box. Quite a few of these have been made, some very professional, like the one Lt. Al Gilks, A.S.C., U.S.N.R., took around the world with him several years ago, and others more amateurly simple, like the one director Norman Foster used one vacation in Tahiti. Foster's gadget consisted simply of a watertight box with a plate-glass window for the camera to shoot through, and another window in the rear through which he could watch the finder. The whole front of the box was removable to permit inserting and removing the camera, and was held in more or less watertight seal by means of bolts (tightly screwed down with wing nuts) and a rubber gasket. The camera was held tightly in place by wooden blocks fitted to match the shape of his camera, which happened to be a Bell & Howell Eyemo, and a simple lever connection passed through a watertight joint so that the camera-release could be worked from outside. A strap of strong webbing passed around the box, and heavy weights were attached to the bottom of this strap to balance the camera and to offset the buoyancy of the device. The strap also served as a handle by which the camera could be manipulated underwater. Foster, clad himself in a regulation diving suit, took this box down to depths as great as 50 feet and brought back excellent pictures.

No matter how you choose to get your camera beneath the waves, you'll find there are definite photographic tricks to be learned if you want good underwater movies. Most important of these are the effect of the refraction or light-bending action of the water on your focus and

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AMONG THE MOVIE CLUBS

Films For Exchange

In normal times, cineamateurs often have the pleasure of meeting members of other clubs throughout the country by dropping in on local club meetings while on vacation trips. But such trips are out "for duration" in the interest of conserving gasoline, tires and transport facilities. Therefore the idea advanced by the Indianapolis Amateur Movie Club (see picture) seems to have unusual merit at this time. Briefly, they are making a 16mm sound-film (also silent versions) introducing the officers and members of their club, for exchange with other clubs. At least one other club—the Long Beach Cinema Club—is considering a similar production. Since we all are interested in seeing how people about whom we've read, or with whom we've corresponded, look and talk, it seems like an idea that's well worth supporting. We're looking forward to the privilege of reviewing these and any other similar films.

Received this month for review is PHILADELPHIA ZOO (200 ft 8mm Kodachrome) made for interclub exchange by the 8-16 Movie Club of Philadelphia. This is not only an interesting record of this club's visit to America's oldest zoo, but contains some unusually interesting scenes of the various animals, made often from angles much more intimate than the usual zoo-visitor can obtain. Available from the Club's Exchange Officer, George Burnwood, 3035 Disston St., Philadelphia, Pa.

Tri-City Elects

At the final meeting of the Tri-City Cinema Club (Davenport, Ia., and Rock Island-Moline, Ill.) before the summer vacation, the following officers were elected for the coming year: Dr. Paul A. White (Davenport), President; Georgia T. First (Rock Island), Vice-President; Secretary-Treasurer, Willis Lathrop (Davenport), and as Directors, Harold Hainline, Harold Swanson, and Dr. F. J. Vermeulen.

Winners of the Club's annual Contest were Tom Gilberg (8mm.) and Georgia First (16mm.), respectively, with "Mother's Little Helper" and "Skippy Sees the Zoo." Clifford Paul, A.R.P.S., was the judge. Runners-up in the 8mm. division were Willis Lathrop and Thomas Severs; in the 16mm. division, Dr. A. H. Parsons, Dr. Albert N. Mueller, and Harry Knox.

The prize-winning films were screened, as were also "Suzanna," loaned by the Long Beach Cinema Club; "New Hampshire on Parade," International prize-winner loaned by Fred Ells of the Los Angeles Cinema Club; and "Doomsday," by Ruth Stuart of the Institute of Amateur Cinematographers, of England, loaned by THE AMERICAN CINEMATOGRAPHER.

GEORGIA T. FIRST

MEET INDIANAPOLIS! Feature of a recent meeting of the Indianapolis Amateur Movie Club was the making of a 16mm. sound film of the Club's members. Seen in the picture from left to right are Dr. Joe Savine (behind the coke bottle), Paul President, Elmer Culbertson at the camera, Paul Bradley under the tripod, G. A. Del Valley at the sound-mixing controls, and President Dr. William E. Gebe seated at the desk. This film is being made for exchange with any club that might be interested in seeing and hearing their fellow acetate-burners in Indianapolis. A similar film on silent 16mm. and 8mm. film is being planned to be sent to clubs which do not have access to sound projection equipment.

Sound, Sports For San Francisco

A home-made sound on-film camera was the scheduled feature of the July meeting of the Cinema Club of San Francisco. Its maker, Ray Maker, of the Greater Oakland Movie Club was to give a short talk on 16mm. sound-on-film, and show a reel from his current 16mm. sound production, "West of the Brazos." Members' films screened included "Sportsman's Paradise," by Russ Pettengill; "Fisherman's Wharf," by Mrs. A. H. Agaton, and "Yosemite Valley," by Ray Luck.

E. L. SARGEANT, President.

Exchanges For Syracuse

Featured on the program of the June meeting of the Syracuse Movie Makers Association was an exchange film, "Bottleneck," from the library of the 8-16 Movie Club of Philadelphia. Two of the Syracuse Club's productions, "Henry's Hobby," and "Haunted School," have been sent to Philadelphia in exchange.

Also shown was "Spike Becomes a Scout," a 45-minute Kodachrome sound-on-disc film with lip-sync dialog, made by one of the Club's members for Scout Troop 5 of Syracuse and written and acted by the scouts. Member Kellogg's film, "June Bride," and Member Cullen's film on artificial breeding of carp at the State Fish Hatchery were shown.

At the July meeting, a lecture on Kodachrome and the uses of wide angle and telephoto lenses was given by A. D. Rodger. The Club has recently purchased a new 6-foot portable screen, and are now contemplating making a projection-booth along the lines of the one suggested by the Long Beach Club's Harold O'Neal in a recent article in THE AMERICAN CINEMATOGRAPHER. Many thanks for that article—may we have many more of them!

LISLE D. CONWAY, President

Aussies Entertain Army Camps

A volunteer group from the Australian Amateur Cine Society is now operating under the Australian Army Educational Service to provide 16mm. film entertainment for troops in camps within 30 or 40 miles of Sydney. Members of the group include G. J. Menon, sponsor of the scheme, Vice-Presidents R. Lowe and J. H. Couch, and members Rex Sharpe and C. S. Crouch. Equipment used includes 1,000-Watt Filmosound and Amprosound projectors with a 9-foot screen. Professional films from various sources are used, and the unit is out at least three nights per week, showing to audiences ranging from 100 to 500 or more men. The Army lends all possible as-

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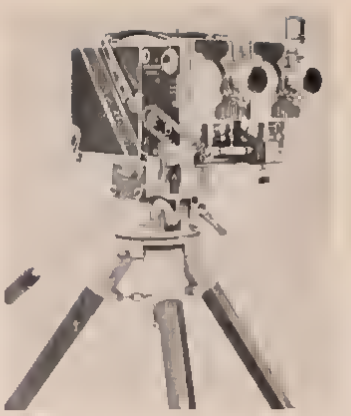
WHY NOT TRY MAKING THIRD DIMENSIONAL MOVIES?

By PHIL TANNURA, A.S.C.



Two Cine-Specials mounted and interlocked for third dimensional filming

IF you're one of the many amateurs who are looking for something new to take the place of pet locations or subjects that have landed on Uncle Sam's restricted list, why not try third dimensional movie-making? Seeing your movies stand out in real, stereoscopic depth will give new life to even the most familiarly commonplace scenes.

Suggesting that amateurs try making third dimensional movies when the professionals haven't done it yet on any really commercial scale seems fantastic, doesn't it? But it really isn't. Quite a few amateurs have already made successful stereo-movies in both 16mm. and 8mm., and in Kodachrome as well as black-and-white.

In things like these, the amateur really has quite an advantage over the professional. The professional has to make sure that whatever he does can be applied on a commercial scale. The amateur — lucky fellow! — doesn't have to worry about that so long as the idea doesn't run into a matter of too much expensive or unavailable equipment. In this case, it means that the amateur can make his third-dimensional movies by a method the professional has known about for a long time but couldn't use because of commercial complications that come up when you are showing the pictures to several hundred audiences a day.

There's nothing particularly new about making third-dimensional photographs. The principle used today is basically the same one used in making the old-fashioned stereographs that graced every parlor whatnot back in the days when bustles and sideburns were in fashion. It works just as well for movies today, but we've got the necessity of working out a better method of viewing our movies than the old-time stereoscope afforded.

We see depth because our eyes are a slight distance apart (the average separation is 2¾ inches), and each eye sees things from a slightly different angle. The right eye sees a little more of the right side of things than the left eye does, and vice versa. And our optico-nervous system is so arranged that each eye telegraphs its own picture to the brain, where the two slightly different images are blended into one third-dimensional one. All stereoscopic vision depends on this matter of two-eyed seeing; a man with one eye can't perceive depth at all.

To get a third dimensional photograph, all that is necessary is to make two almost identical pictures of a scene through a pair of lenses that are spaced about the same distance apart as the average human eyes, and then to provide some method of viewing these pictures so that the right eye can only see the right-eye picture, and the left eye sees only the left-eye picture. Our brains will do the rest, blending the two into a single image with natural depth and roundness.

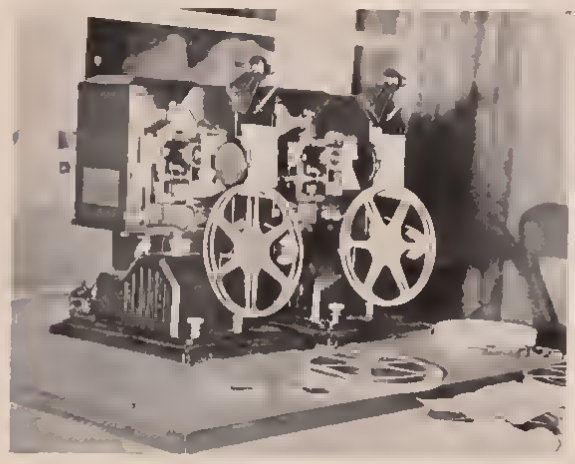
Grandfather's stereoscope did this optically, putting a lens in front of each eye to focus it properly on the appropriate picture, and generally providing a little plywood panel between the lenses to make sure the left eye didn't get a chance to peek over at the right-eye image.

The occasional experimental three-dimensional 35mm. movies, like the MGM-Pete Smith "Audioscopics" short-subjects, did the same thing by a complementary color filtering. The two necessary pictures were printed on a positive film with an emulsion on each side of the celluloid base. One emulsion was dyed red, and the other blue-green. Everyone in the audience had a little spectacle-like card through which to look at the pictures. Over one eye-hole in this card was a bit of red gelatin, which let the red image go through but completely filtered out the blue-green one, and over the other eye-hole was a blue-green gelatin which kept the red image from passing through.

The best system for amateur use, however, is to keep the two images always on separate films, and run them on two synchronized projectors with a pola-screen over the lens of each projector. These pola-screens are "crossed," so that the light from one projector is polarized in one plane, and the light from the other is polarized in a plane at right angles to that of the first. The audience wears spectacles with similarly crossed pola-screen lenses, so that each eye can only see its proper image.

The mechanics of making and showing stereo-movies by this method isn't so terribly complicated, but since it calls for two cameras and two projectors, probably the best way to handle it these days would be for two filmers to team up on it. The mechanical end of the problem will certainly be most easily handled if both cameras are of the same make, and both projectors also of the same make.

The two cameras should be mounted on a base which not only holds them firmly aligned, but provides a means for mechanically interlocking their mechanisms. Metal construction is naturally best for this base, but in these days of



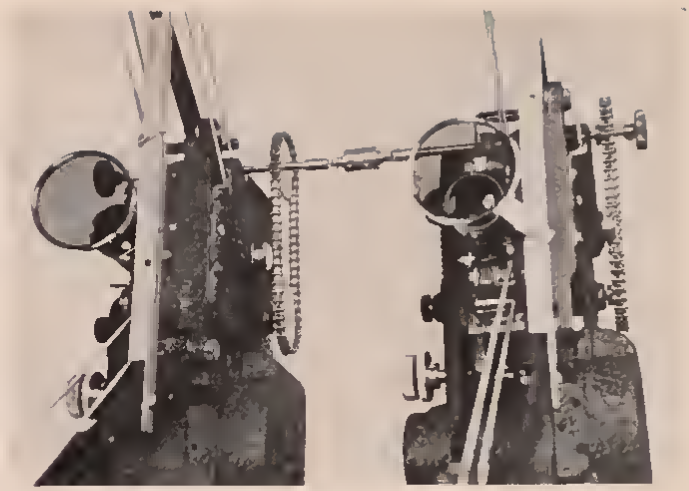
Dr. Ghrist's projection set-up for stereoscopic 8mm. Note viewing spectacles in foreground, and rigid base mounting.

priorities on metal, wooden construction—if sufficiently strong and accurate—should certainly not be scorned. The base should provide for mounting the cameras so that their lenses are horizontally parallel, and spaced 2¾ inches apart from center to center. It should also provide the necessary ¼-inch bolts to screw into the cameras' tripod-sockets for attaching them to the base, and a similarly threaded socket (a countersunk nut will do) by which the base may be attached to the tripod.

Some of the amateurs who have experimented in third dimensional cinematography have gotten adequate results mounting their cameras on a base which held them rigidly in fixed position, but I think a much better plan was one used by one experimenter, J. Kinney Moore (a two-time prize winner, by the way, in THE AMERICAN CINEMATOGRAPHER'S International Amateur Movie Contests), who divided his camera-base lengthwise along the center-line, and hinged it at the front end. This construction has two advantages. First, it permits swinging the left-hand camera outward so that the right-hand one can be more easily reloaded. More important from the standpoint of results, it permits the cameras to be "toed in" so that both are centered on the same object, to minimize objectionable parallax effects. The point to align the cameras on is usually the most distant *important* object in the scene. Pictures made with a camera set-up that can be lined up this way are usually more easy on the eyes than those made with a fixed-camera set-up.

Mechanically interlocking the movements of the two cameras is a problem that differs according to the type of camera used. It is easiest with cameras which, like the Cine-Special, the Bolex, the Victor and some of the Filmo 70's, have or can be fitted with a hand-crank drive. In this case, all you have to do is insert a short shaft into the hand-crank shaft opening of the cameras, fit a sprocket to each shaft, and interconnect the cameras by means of chain belts and a common shaft in the base. If you use a pivoted base, of course, this connecting shaft should be fitted with a universal joint so that the cameras will operate together when "toed in."

With other types of cameras, this matter of interlocking may not be so easy, as it will probably require a minor operation on the mechanism side of the camera-case to gain access to some shaft or gear in each camera that you can use for establishing the interlock. Another experimenter, Dr. O. E. Ghrist, of Glendale, California, found it comparatively simple, though, using two Model 20 Eastman "eights." Dr. Ghrist made use of the large winding-gear on the motors of these cameras. He cut an aperture in the case of each camera (on the motor side, of course) to expose these gears. He had a similarly toothed gear in the solid shaft in the base which interconnected the two cameras. Then it was a



Three dimensional projection set up using two Ampro 16mm projectors. Note simple but positive interlocking system from hand turn shafts, and mounting of pola screens rotated at right angles to each other.

simple matter to mount the two cameras so that the gears protruding from the base meshed with the gears on the winding-shafts of the cameras, forming a simple and positive mechanical interlock.

The same basic methods can be used in mounting and "syncing" the two projectors for showing the stereo-films. The projectors should be mounted on a common base, with some sort of provision for "toeing in" one projector, so that regardless of the projection-distance, the two images can be projected in approximate register. Absolute register isn't possible, of course, since the right-hand and left-hand pictures are taken from slightly different angles; but if they are pretty accurately superimposed, the audience will find the pictures a lot easier to look at.

Setting up a mechanical interlock is usually easier with projectors than with cameras. Most 16mm and 8mm. projectors have a shaft—usually at the front of the projector—which carries a knob by means of which the projector can be turned slowly by hand when threading. With the hand turning knobs removed, these shafts offer an ideal means of interlocking the projectors.

If you are going to do all or most of your projection at a fixed distance, you can simply put a sprocket on each shaft, and interconnect them by a chain belt. If you expect to change your projection screen distance frequently, you'll have to allow for changing the "toe-in" of one projector, so your interlocking mechanism will have to be more flexible. One way to do this is to fit a pair of bevel gears to each projector and interconnect them with a horizontal shaft which is fitted, of course, with a universal joint.

In front of each projection lens is mounted a pola-screen, either attached directly to the projector (separate from the lens, of course, so that the polarizer won't be revolved when the lens is focused[1]) or supported by an upright from the base on which the projectors are mounted. The pola-screens should of course be rotated so that their planes of polarization are at right angles to each other. Since the pola-screens in polarizing the light, also absorb a lot of it (on a camera they have a factor of 4), you'll do well to use the most powerful projectors and globes you can get. Even then, you'll notice a loss of brilliance compared to normal "one eyed" projection.

Since the screen has to reflect polarized light, an old-fashioned silver-surfaced screen with a very uniform, smooth surface is best. If you make your own screen, use a metallic silver paint and paint it—or, better, air-brush it—on with the brush moving only in one direction across the screen rather than with a two-and-fro stroke.

The audience must be supplied with some form of polarizing spectacles through which to view the picture, otherwise, all they'll see is an incredible-looking double image on the screen. The cheapest way to do this is to get your polarizing material in gelatin sheet form, and cut it up as necessary. You don't need a big piece for a viewing-polarizer—a square ½ or ¾ of an inch in size is ample, and you can even cut this down to a rectangle ½-inch long by ¼-inch high and still give plenty of room for viewing a small-screen picture. The gelatins can be cemented to a cardboard disc which in turn is mounted in a pair of dime-store spectacle-frames or, if you want to be especially conservative, mount the polarizers in a small, mask shaped piece of cardboard which the spectator can hold in front of his eyes. If your stereo program is more than about half a reel in length, though, the spectacle

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BUSINESS MOVIES

CATERPILLAR DIESELS GO TO WAR

Promotional news-documentary, 1400 feet black-and-white, sound

Produced by **Caterpillar Tractor Co.**

This is in many ways the best of this firm's films we have yet been privileged to view. In characteristically swift-moving fashion, it tells something, at least, of the tremendous job "Caterpillar" tractors and diesel power-units are doing in America's War Effort, preparing airfields, Army Camps and bases, to say nothing of aircraft, munitions and other war production plants in every corner of the country. When to the bewildering number and variety of projects shown in this film are added (as every viewer will do mentally) the many highly secret projects being similarly carried out here and abroad, one can't help feeling America is marching to war on caterpillar treads

Technically, this picture is excellent. It seems to be an interesting blend of really good reductions from 35mm and equally good black-and-white duplicates from direct-16mm. Kodachrome The photography is excellent, and the laboratory work well above the usual standard of black-and-white commercial 16mm—quite the best, in fact, that we've seen in some time.

The sound-recording is the best we've yet heard on a "Caterpillar" picture Either the recording studio has changed their 35mm. characteristics to match those of 16mm. projectors, or (which seems more likely) the recording was done direct in 16mm In any event, the sound is excellent.

GIFTS FROM THE SUN

Documentary on fruit-drying; 800 ft. Kodachrome, sound

Produced by **W. A. Palmer & Co.**

Presented by California Packing Corp (Del Monte).

Making a color-film for a fruit-packing organization like Del Monte is an acid test of both the cinematographer and the laboratory producing the Kodachrome duplicate release-prints In this case, W. A. Palmer & Co. did both, and performed both tasks magnificently We pride ourself on having a rather critical eye for color-reproduction, but we don't see how the color in "Gifts From The Sun" could be improved The photography is first-class, and the color print one of the finest, if not actually the finest we've ever seen

The picture deals with the preparation of sun-dried fruits—apricots, prunes, raisins, etc.—and obviously had to be shot when the fruit-pack permitted, rather than when the director-cinematographer chose Luckily, however, the well-publicized California sun was the drying agent, and thus simplified weather problems on the many exterior scenes. The interior scenes show an exceptionally good understanding of the methods of controlling the color-temperature of lighting, and balancing both lighting and exposure to give the best color-reproduction The sound is, as usual with Palmer's recording work, top-quality direct-16mm recording.

The story-construction of the picture is entertainingly handled, with the narration a three-way affair between the sun and a married couple apparently in the audience.

BEHIND THE RED SHIELD

Documentary, 1100 ft Kodachrome, sound.

Produced for the Salvation Army by **Randolph Clardy.**

Direct-16mm recording by **Telefilm.**

It is probable that this picture was produced on a rather limited budget and schedule, but Clardy's picture-making skill makes it interesting throughout His treatment of the central character of the film's rehabilitation theme is excellently dramatic, and his photographic treatment — especially his lightings wherever he had any opportunity at all for studio-type lighting—is technically first-rate. His handling of other phases of the subject-matter is good, especially in the way he makes the film answer the question we all ask about what does the Salvation Army do with all the broken-down furniture, clothing, etc , it collects for salvage. All told, the picture should do its sponsors a lot of good, in almost every part of the country

MEXICO BUILDS A DEMOCRACY

Documentary, 800 ft Kodachrome, sound.

Produced by **Contemporary Films** for the Office of the Coordinator of Inter-American Affairs.

Direct-16mm recording and Kodachrome duping by **W. A. Palmer & Co.**

Primarily an instructional film, this picture is more properly an inspirational film, for it tells a moving story of Mexico's impressive campaign against illiteracy A faithful re-enactment of recent events, the picture shows how a young Mexican teacher, after first mastering the language of the Indians of the region, goes forth alone to spend six months in a remote little mountain village, while he teaches the Indian inhabitants to read, and trains from among the villagers a teacher to follow in his footsteps after he leaves. There is drama in the way he saves the village from an epidemic, and throughout are innumerable characteristic touches which will help us better to understand our nearest southern neighbors.

Technically, the picture is excellent Photographed on the actual locations, deep in the mountainous heart of Mexico, it was by no means an easy photographic assignment, but it is very well handled A few more close-ups of the big-head variety would have been welcome, but this was probably impossible because the cast was composed entirely of untrained actors The story is told in silent form, with narrative sound and a musical accompaniment of authentic Indian melodies of the region The recording and the Kodachrome release-print are among the best yet seen The optical effects also deserve comment, not only because they are very well done, but because of the smooth way they fit into the picture

All told, we can recommend this picture very highly, not only to schools and educational groups interested in learning more of Mexico and obtaining an entirely new appreciation of the Indian mentality, but to photographic groups whose interest may be expected to be strictly technical.

Movie Clubs

(Continued from Page 361)

sistance, including aid in planning programs and providing transportation to hard-to-reach camps Special leaders have been made up, using the name and insignia of the A A C S, and are attached to the films shown

JAMES A. SHERLOCK,
Publicity Officer

Travel-Films For Long Beach

The July 15th meeting of the Long Beach Cinema Club headlined two excellent 16mm Kodachrome sound-films loaned by the Union Pacific Railroad. Titled "Moon Over Sun Valley," and "Yellowstone Park," these films were a tantalizing reminder of vacation pleasures back in the days before rationed tires and priorities on travel.

PRUDENCE BRAKLOW,
Secretary.

Montage

(Continued from Page 359)

footage for each idea. The visual effect would be different, but the idea conveyed would be the same.

Both of these types of montage have a definite place in picture making—amateur picture-making by no means least I would suggest using the Russian type of montage, made up of a succession of increasingly short "flash" cuts accented by the use of striking camera angles, for occasions where you want to build to an extremely fast tempo in getting over an impression of strife or quick-paced confusion. A good example might be in a picture dealing with a lost dog, in a sequence where you wanted to convey something of the poor dog's terrified confusion at finding himself in the mid-

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dle of a big-city intersection, with cars apparently rushing at him from all sides. Assembling by this technique a succession of "flash" shots — all made shooting upward from a low position, and if possible with a wide-angle lens— of car wheels passing, cars and truck wheels approaching head-on, of drivers leaning out and shouting, of hands pushing horn-buttons could, even in a silent picture, build up to a crescendo of visual impact such that you would almost literally seem to hear the blasts of the horns and the scream of brakes.

On the other hand, I would suggest using the American type of superimposed-image montage for occasions where you want to convey an impression of the lapse of time, or of bewilderment. For example, you might want to put over the idea that a character, out of a job, spends a long and weary time answering "help wanted" ads, with no success. You might begin showing him sitting on a park bench, reading the want-ads. Then cut to an extreme close-up insert of the head of the "Help Wanted" column. After this has been on the screen a moment, superimpose a close-up shot of his feet as he gets up from the bench and starts to walk, if you can, make this as a dolly-shot in which the feet, once the walk starts, keep walking continuously into the backward-moving camera. Hold this until the end of the montage. In other portions of the frame—above and to the left side—superimpose short, close shots (made preferably from a slanted-camera angle) of the man knocking at doors, ringing doorbells, passing under "Employment Office" signs, etc., while at the upper right you similarly superimpose close shots of stern-faced men—obviously employment managers and foremen—shaking their heads and obviously indicating no jobs are available. Through all this, you keep the background of the "Help Wanted" ad (it would be most effective if this could be treated as a slow-moving "roll-up" title) and the doggedly walking feet. In a comparatively few feet, this will tell the whole story of a dreary, days-long search for employment.

Professionally, of course, we would assemble these various elements by means of the optical printer. The amateur, however, can do it quite as effectively by multiple-exposure in either 16mm. or 8mm. For that matter, one of the most effective amateur montages I have ever seen was made in 8mm by Past-President Bob Loscher of the Los Angeles 8mm Club who, in his "Red Cloud Lives Again," which a few years ago won the Grand Prize in THE AMERICAN CINEMATOGRAPHER'S International Amateur Movie Contest, used triple and quadruple exposures to put over a raid by Indians on a pioneer wagon-train.

Having a wind-back fitting on your camera helps in making these multiple exposures, but it is by no means necessary, since you can always rewind the film in a darkroom or changing-bag, rethread the camera to a marked starting-point and then, with the lens capped, bring your film to the start of your superimposed exposure by paying careful attention to the footage-counter. In 8mm., of course, it's even simpler, since you can rewind the film by simply running the film through the camera with the lens capped until you have the film on the right spool and with your start-mark showing.

In making multiple exposures, the general rule is of course to split the exposure between the two or more takes, though sometimes you may want to give one take a bit fuller exposure to accentuate it.

Contrast is an important factor in making successful double-exposures. If both elements are of high contrast, they're likely to appear very mixed-up on the screen, if both are of flat contrast, the result is likely to be rather vague on the screen. The best results come if you can superimpose a fairly high-contrast "take" over one of lower contrast.

Also, the double-exposed elements should be rather simple. You can use a long-shot for an overall background if you wish, but for the superimposed elements which contain the key action, it's usually better to use close shots with simple action and backgrounds, and usually shots made from striking camera-angles. You can concentrate attention better on the action or face in such shots by using a plain black background, black velvet is excellent for this. For example, in the first example, in the first example I gave of an American-style superimposed montage, I would advise shooting the close-up of the machine gunner against a black velvet background against which only his figure and the gun would show. This would give a background against which the other exposures of the montage would stand out more prominently.

If you want to confine some of the superimposed action to only a small area of the frame, you have several possible methods. If you have a camera like the Cine-Special, you can of course use the mattes that slide into the matte-slot in that camera, directly in front of the film. This, however, will give you a sharp matte-line. If you want a soft matte-line it is better to use a matte placed in front of your lens. If the matte is too far in front of the lens, it, too, will give a sharp matte-line, so bring it in to within a few inches, depending on the focal length of the lens used. For a soft, shadowy blend, use a matte with a deep-cut saw-tooth edge.

Using mattes in front of the lens, you will have to have some means of lining up your shot accurately. With a Cine-Special or one of the magazine cameras, you can do it through the ground-glass focusing finder, of course. With other cameras, you will usually have to rely on some sort of an alignment guage by which you can move the finder over until it occupies exactly the spot the lens occupies in shooting. This method, of course, is only as accurate as your finder.

The professionals have sometimes used another system for accurate lining-up on some types of trick-shots. They have a device which fits on top of a tripod and consists of a ground-glass and optical magnifying system, and a mount into which the actual lens which will be used to shoot the scene can be fitted, and is, of course, in exactly the same position in relation to the tripod as it will be when the lens is mounted on an actual camera. If you're mechanically inclined, it should not be too difficult to build up a similar gadget, using, perhaps, the bellows and focusing-screen of a second-hand vest-pocket plate camera, and a mount adapted to accept the lens of your cine camera. A fairly strong reading-glass will magnify the ground-glass image for you.

At any rate, don't dodge making superimposed multiple-exposure montages simply because you haven't a camera with all the professional refinements of, say, a Cine-Special or a studio Mitchell. Some of the best multiple-exposure montages I've seen in 16mm. and 8mm. have been made with simple cameras. The really vital factors are care in execution, and mental ingenuity in planning the montage. And these qualities are by no means limited to professionals and the owners of de luxe cameras. END

Third Dimension Movies

(Continued from Page 363)

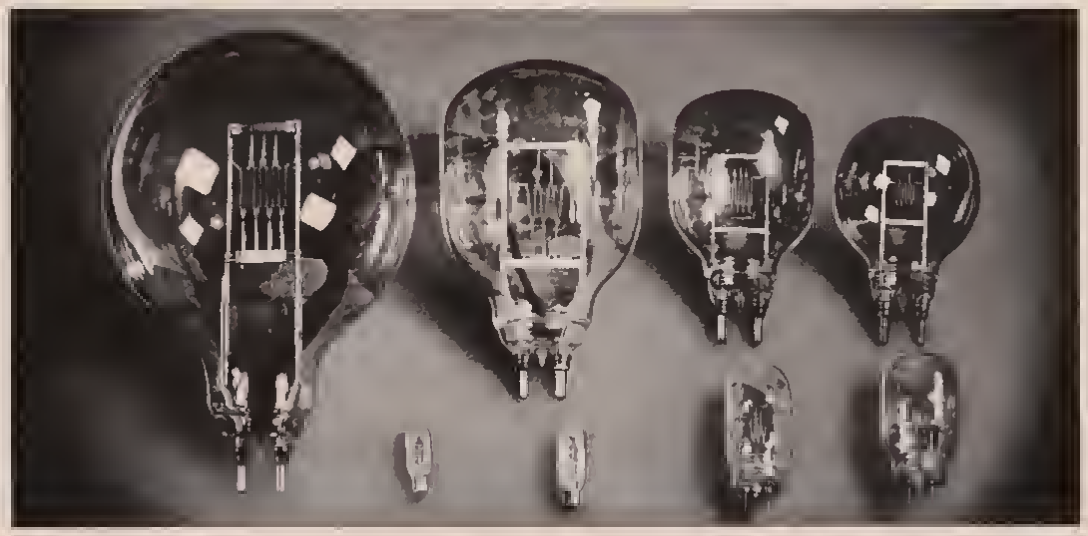
mounts are certainly easier on the audience!

The polarizers in the spectacles should be mounted to polarize the same way as the pola-screens on the projectors, that is, the gelatins in the left-eye parts of the spectacles should polarize light the same way as the pola-screen on the left-hand projector, and the right-eye spectacles and the right projector's pola-screen should be matched to each other the same way.

It is vitally important that the right-hand and left-hand films should be kept separate from start to finish, and of course photographed, edited and projected "in sync." Since the cameras always start and stop together, and hold each other at the same speed, your scenes, as they come back from the processing laboratory, should be in sync. To check on it, mark the ends exactly, and then measure forward on each film to the beginning of the scene.

Editing is of course done in the usual way, with the exception that the scenes in the right-hand reel and the left-hand reel must match to the exact frame. When the editing job is complete, mark a starting frame on each reel's leader, so that both can be threaded into the projectors in synchronism and started absolutely together. Incidentally, remember that if one film breaks, when you repair it you'll also have to trim out

FROM 10 KW TO "DINKY INKY"



For "modelling" G-E MAZDA lamps provide range enough to handle the lighting problems on nearly any set. Each of them packs a punch . . . from the big 10KW down to the "dinky inky" 150-watt. And their compactness gives you decided flexibility in producing just the lighting effect you want, even in cramped quarters. In proper equipment, these G-E lamps can also give a spread beam for "flood" use. And for Technicolor, you'll find that G-E MAZDA "CP" lamps behind "Whiterlite" filters blend smoothly with daylight, to help you balance or control it.

For "fill." G-E MAZDA Movieflood and Photoflood lamps also work for many a cameraman. Reason: Low cost, high efficiency, and low current consumption. This last point is especially important when you're "on location," with limited power supply. And G-E Photofloods are available with "daylite" bulbs.. to mix effectively with daylight for color shots.

General Electric makes lamps for every photographic purpose. If it has to do with lighting, G-E *knows the answer!*

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movies can be a lot of fun if you plan your compositions with the effect of depth in mind. In long-shots, try always to have a natural frame of some sort, and preferably a figure or other object on the foreground, to heighten the illusion of depth. If you pick your angles right, you can get some startling effects, with trees and other objects in the immediate foreground apparently jumping right off the screen into the middle of the projection-room. And there are always the time-honored tricks of stereoscopy with which to startle your audience—having people apparently walk right off the screen into the room, extending a fishpole or something of the sort apparently over the heads of the audience, having a three-dimensional car apparently run off the screen and over the spectators, and so on. Three-dimensional titles, in which the letters seem to hang in the air several feet in front of the screen are another novelty, too. All told, if you try making third-dimensional movies, you'll certainly find plenty of ways of adding novelty to even the most commonplace pictures. Try it! END

Photography of the Month

(Continued from Page 355)

realism, his camerawork and lightings give the production. Covering as it does the sixty four year span from 1878 to the present, the picture gives its cameraman a continuous series of problems of lighting, especially that of keeping the lighting of the innumerable sequences in and about theatres from the gas light period up to the present lit so each is visually in keeping with its period. Howe does this uncommonly well, at the same time enhancing the film's several strongly dramatic moments through effective visual treatment.

The many stage numbers are handled delightfully. So often, in sequences of this nature, the temptation in motion pictures is to splurge on something so impressive no stage could possibly house it. But in "Yankee Doodle Dandy" both the directors and cinematographer Howe have hewed to the line of strict realism—even to very stagey looking painted backings—to the very great advantage of the production as a whole.

It goes almost without saying that Jimmie Howe's photographic treatment of the players is excellent. Even in the sequences on supposedly gas-lit stages, he keeps them looking their best, yet without losing the necessary impression of realism.

The special-effects work of Byron Haskin, A.S.C., and Hans Koenekamp, A.S.C., is another feature of the picture which is well up to their usual high standard. And the montages by Don Siegel deserve a great deal of credit, as well.

WAR EFFORT SHORT SUBJECTS

Produced for Victory by the Motion Picture Industry.

Recently the Industry's War Activities Committee held a special press showing of a representative cross-section of the many short subjects made, and in some instances distributed and exhibited, by the industry as an aid to the War Effort. Unfortunately, space does not permit a detailed review of these films; but we cannot avoid expressing a wish that this program could be roadshowed as a unit not only through this country, but throughout the United Nations. Not only would it convey a vital wartime message to millions of our fellow-citizens, but it would also show in tangible form something of what the motion picture industry is doing (often without profit) as its many-sided contribution to the fight for freedom.

Included in the program were films made for the U. S. Forest Service to bring home to the public the dangers of forest fires; "The Arm Behind the Army," a war training film made for the Army, for exhibition to soldiers and to their un-uniformed fellows, the workers in the war production plants; "Divide and Conquer," a theatrical short-subject showing—to a considerable extent through captured Nazi propaganda film scenes—how France was softened by the Fifth Column. Another theatrical short was "Mr. Blabbermouth," an amusing but pointed cine-editorial on the wartime rumor-monger; "Parachute Athletes" was another theatrical film which showed something of a spectacular phase of military training. "Identifying the F-2-A (Brewster Buffalo)" was one of Walt Disney's unusual films on aircraft identification made for the U. S. Navy; "The Air Raid Warden" was another excellent theatrical-documentary, though marred by the technical error that the air raid warden called the fire department, which in an actual raid would be most unlikely. Finally, the Army training film "Combat Counter-Intelligence," one of 182 reels of training films already completed by the industry for the Army, proved to be a film which well deserves general theatrical release, and most particularly a civilian version, made along the same lines but devoted solely to the civilian's duty of "zipping his lip."

All told, the industry and everyone in it can well be proud of the achievement of which this evening's program represents only a limited cross-section.

BEYOND THE BLUE HORIZON

Paramount Production (Technicolor)
Directors of Photography: **William C. Mellor, A.S.C., and Charles P. Boyle, A.S.C.**
Special Photographic Effects by **Gordon Jennings, A.S.C.**
Transparency Projection Scenes by **Farciot Edouart, A.S.C.**

In many ways "Beyond the Blue Horizon" (née "Malaya") is the most pictorially pleasing of Paramount's series of Technicolor exposures of Dorothy Lamour in a sarong. Directors of photography Billy Mellor and Charles Boyle employ their Technicolor cameras to very excellent advantage on both exteriors and interiors alike. It goes, of course, almost without saying, that the Technicolored appearance of the players is excellent.

Like its predecessors, "Beyond the Blue Horizon" aims definitely at pictorial effect, and achieves it in no small measure. Very probably the idealized version of a Malayan jungle is much more pictorial than the genuine article; it is certainly better lighted, anyhow. As a matter of fact, the production derives no small amount of technical interest from the very excellent way Mellor and Boyle have handled the tremendous problems of lighting convincingly the many extremely large jungle exteriors built inside a sound-stage.

Unlike some of the previous films of this series, "Beyond the Blue Horizon" does not make use of a hurricane or volcanic erruption for its climax, but that climax—a chase in the best manner—offers a noteworthy combination of skilled direction, cinematography, and special-effects and transparency process camerawork.

SWEATER GIRL

Paramount Production
Director of Photography **John Mescall, A.S.C.**

This is another of those inherently unimportant Paramount program pictures which John Mescall's camerawork boosts to a production importance it probably doesn't merit. His compositions and lightings give it that altogether indescribable quality termed "A-picture appearance." The title, by the way, is misleading, for the picture is actually a surprisingly ingenious little murder-mystery.

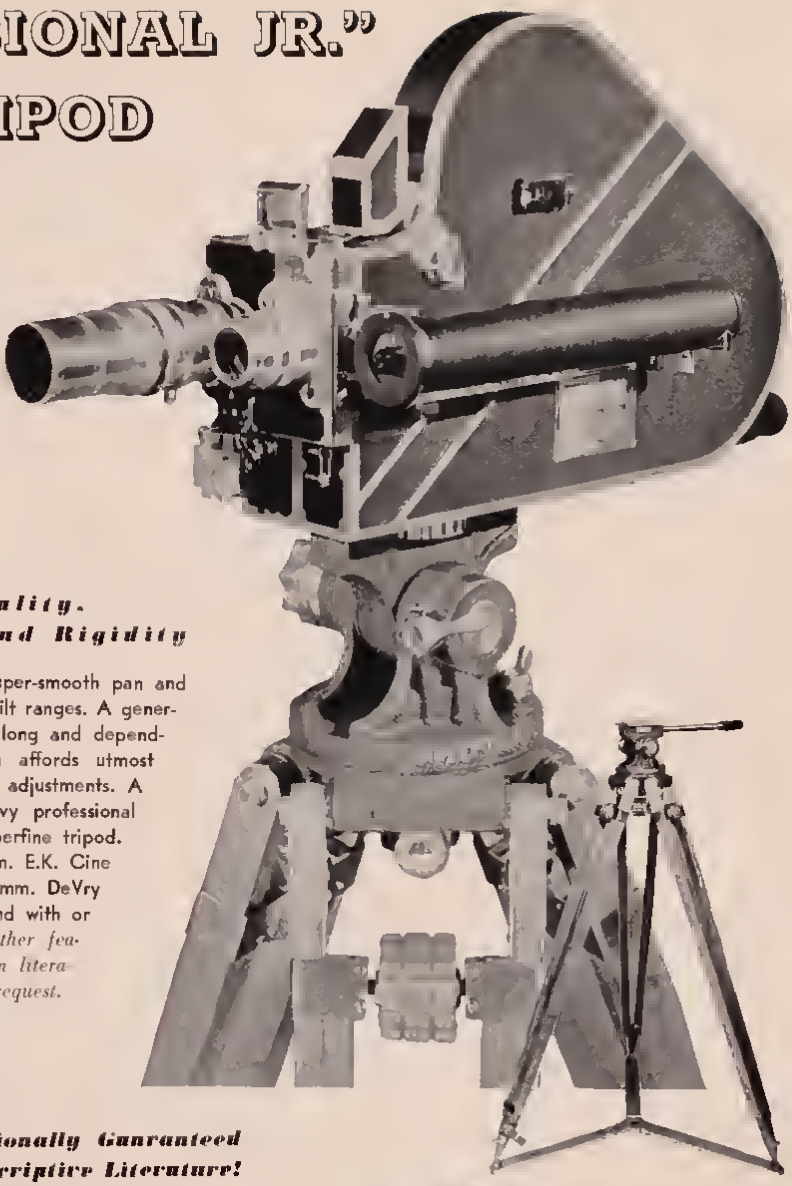
This, of course, gives Mescall an excellent opportunity to create interesting effect-lightings, which he does with his usual skill. His work in the more straightforward sequences is also excellent, and he shows his players—the majority of them young enough to be an asset to any cameraman—off to excellent advantage. All told, for both photography and entertainment, "Sweater Girl" is well worth 77 minutes of anyone's spare time.

I MARRIED AN ANGEL

Metro-Goldwyn Mayer Production
Director of Photography **Ray June, A.S.C.**

Viewed from the strictly photographic angle, "I Married An Angel" is an excellent example of Ray June's customarily excellent camerawork. Viewed as entertainment, it's decidedly disappointing, for instead of the sly fantasy the story requires, it is brought to the screen with a heavy-handed treatment that is compromising all the time with literalness, and thereby misses the touch which would in the hands, say of a Lubitsch, have made "I Married an Angel" delightful. The montage which closes the

"PROFESSIONAL JR." TRIPOD



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Left—35mm Eyemo with motor and 400 ft. magazines mounted on "Professional Jr."

FRANK C. ZUCKER
CAMERA EQUIPMENT CO.
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dream sequence is a noteworthy example of this.

None the less, since the cinematographer's job is to photograph what is placed before his lens, Ray June has done an excellent job with the material that was given him. His compositions and lightings have all his characteristic deftness, though in some of them you get the feeling that perhaps he, too, was tired of the whole thing. He makes his players appear to really excellent advantage, though one close-up of Jeannette MacDonald in the costumer's-shop sequence should certainly have been removed.

The special effects work is commendable, especially that in the sequence in which Miss MacDonald makes her first entrance as an angel. The montage, on the other hand, was really disappointing, and makes one wish the very capable MGM special-effects staff had been given a freer hand with it.

Underwater Movies

(Continued from Page 360)

lens-angles. Refraction tends to bend the focus away from your lens, so that if you should be able to measure the actual distance from your camera to the subject, and set the focus accordingly, you would find on the screen that your point of actual focus would be several feet behind the subject. For this reason, if you make movies under water, focus your camera at a point 1/3 closer than the actual subject-distance. For example, if your subject is actually 12 feet away, set your focus for 8 feet and the picture will be in perfect focus.

Refraction also narrows down your lens-angle considerably, so that an underwater scene made with the usual 25mm. lens looks on the screen as though it had been made with a 2-inch. The best way to get around this is to use a wide-angle lens if you have it (under water a 15mm. lens will give about the same angular coverage you'd expect from a 25mm. on land) and if you use a direct type of finder, match it to the narrower angled lens.

Lighting underwater scenes is best if your light comes from a fairly high cross-light or ¾ front-light angle. The light should be direct sunlight, and quite strong, for while you can get a technically adequate underwater exposure on an overcast day, the resulting picture will be so flat and "muddy" that you'll find it useless.

Exposure-values under water are surprisingly good if you shoot in clear water and on a sunny day. If you have an opportunity to take an underwater reading with your meter, as is possible in working from a "hole in the water" or an observation-port in a swimming-pool, your meter-reading will be quite accurate if it is taken with the meter close to the glass of the port. If you can't do this, probably the best method is to make preliminary exposure-tests, and use these as a guide. The light underwater is often deceptive: it is likely to give you much more exposure on your film than you would expect from visual estimate. Of course exposure values will vary according to the clarity and depth of the water, but a safe starting-point for judging underwater exposures would be to begin by trying an exposure from two to three stops larger than you would use for the same film in the open air.

If you are shooting in a natural underwater location like a lake or river, try if possible to use a location where the bottom is of light-colored sand, as this will simplify your exposure-problems and reflect some light up into the shadows. If possible, shoot most of your shots either shoreward or with the camera pointed sideways along the shelving part of the beach. Shots made with the camera pointing straight out to deep water usually have a dark background, and nothing to give them depth or perspective.

There are two further points you'll have to guard against. One of these is reflection from the inner surface of the glass port through which you shoot. If you are shooting from a topless camera-tube, large or small, cover the top of the tube with black cloth, to kill reflections.

The other is the condensation of moisture on the cool glass of the port. If your camera-tube is open to the air, the air is likely to be pretty hot these summer months, while the water outside is likely to be cold. Moisture from the atmosphere will naturally condense on the inner surface of the glass window, which is cooled by the colder water outside. This will fog up your window, just the way your breath fogs the windshield of a closed car on a wintry day. Professionals often use a small electric fan to circulate the air and prevent this. Another method is to put some ice inside the camera tube, to cool the air to a point nearer the temperature of the water outside. And there's another expedient—a familiar one to old-time motorists—which will help to some extent: just moisten a cloth with tobacco-juice and rub it on the inside of the glass. This will prevent the moisture from condensing in foggy droplets, and make it adhere as a thin, almost imperceptible film. END

Diopters

(Continued from Page 358)

made easily enough, but they're not so convenient, if you use strong lenses, aberrations will be introduced which will prevent getting a sharp image, while if you use weaker lenses, the image will be sharp, but the separation between them must be so large that you have a long tube which will cut into the field of any but very long-focus camera-lenses.

Here are the specifications with which to build a set of three of these distorting-lens systems which will give you a convenient range in power from 1.2 to 1.6, which should be enough for most requirements. For a magnification of 1.2, use a plus 5 diopter lens and a minus 6 diopter lens, spaced 33.33mm. apart. For a magnification of 1.5, use a plus 8 D lens and a minus 12 D lens, spaced 41.67mm. apart. For a magnification of 1.66, use a plus 9 diopter lens and a minus 15 diopter lens, spaced 43.34mm. apart.

In this connection, the term "magnification" is used advisedly, for these cylinder-distortion systems produce the effect of distortion by magnifying the image in one plane or direction—either horizontal or vertical—and leaving the other virtually unchanged. The axis or direction of distortion is determined by the inclination of the axes of the two lens-cylinders of the distorting combination. If both axes are vertical, the image is distorted horizontally, and vice-versa. By revolving both units together, it should be possible to make the distortion change from horizontal to vertical during a scene, which can produce some very bizarre effects for nightmare or drunken scenes.—END

Back-Projection

(Continued from Page 357)

naturally record a lovely blank. The professionals get around this by having the two mechanisms interlocked either mechanically (as in the optical printer) or electrically, as in their back-projection process equipment. Unless you want to go to the trouble and expense of having synchronous electrical motors fitted to your camera and projector, this is out of the question. It's out "for duration," anyway, since there are other, more important uses for synchronous motors in wartime!

But we've found that you can lick this problem of synchronism by simply having the camera and projector operate at different speeds. There should be a differential of about 50%; otherwise, the two shutters may get out of sync at intervals. I've heard of one instance in which this trick was tried in 8mm. and the camera and projector got out of step precisely every sixth frame, producing an irritating black flash.

For silent pictures, we've had the projector running a bit faster than the camera—as close to 24-frame speed as we could reasonably make it, while the camera stayed at 16-frame speed. When taking the picture with a sound-camera—especially, of course, if adding sound to a silent picture—your camera will be running at 24 frames per second, so the projector should run at 16-frame speed.

We've found plenty of useful ways to put this idea of rephotographing pictures projected on a translucent screen to work for us. Among them may be mentioned making titles with moving backgrounds (or still backgrounds, for that matter); for enlarging a part of a scene to give a closer angle; securing additional footage of a scene; reversing action; adding sound to a silent picture through the use of a single-system sound-camera; and enlarging 8 to 16, or

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reducing 16 to 8, to say nothing of duping 16 to 16 or 8 to 8, or making a black-and-white dupe of a scene photographed in color.

To make titles with a moving background by this method, the first step is of course to select the background shot that fits your need. Then you make your title by double-exposure. Use white letters on a dull-surfaced black card, or better, black velvet, for your first exposure. After photographing the lettering, rewind your film to the starting-point, which of course has been previously marked. If your camera has a wind-back on it, of course you can do it in the camera, with the lens capped. If you haven't a wind-back, you can do it in a darkroom or changing-bag. Either way, the next step is to photograph your background, as already described, by back-projection.

You can fade titles and background in and out with either a diaphragm fade or a fading-glass; and if you have an accurate mechanical wipe there's no reason why you couldn't make the title wipe in and out with the preceeding and following scenes. For that matter, if you have such a wipe, you could make scenes already photographed and processed wipe in and out by this method.

If you have a light-toned background-scene, you can get dark letters against this light background by simply putting cut-out letters on a sheet of glass placed in front of your screen. This way, you'll get the moving-background title at one take.

If you're skillful in lighting, you might be able to improve the whiteness and clarity of white-lettered titles double-exposed against a dark background by an extension of the same trick. Use white cut-out letters on a pane of glass in the titler, directly in front of a black background, and lit so that there's no reflection from the glass itself. Then—still keeping the glass with the cut-out letters in the identical position in the titler—rewind, and make your second exposure with no front-light, and only the projected image on the screen. The cut-out letters, remaining in the same position for the second take that they occupied in the first one, and being silhouetted against the screen, will serve as masks, and give an absolutely clear letter in your double-exposed title.

Duping 16mm. to 16mm., 8mm. to 8mm., or reducing or enlarging one to the other is simply a matter of straightforward projection and rephotographing, using, if you're enlarging or reducing, a camera of the proper size for the rephotographing. We've had surprisingly good luck "blowing up" 8mm. Kodachrome to 16mm Kodachrome, in some instances—as in a recent experiment with some of the hula-dancing sequences Junior Past President Midge Caldwell brought home from Hawaii—adding sound to what was originally a silent 8mm. color-film. You'll get the best results in enlarging 8 to 16 if you use color, by the way, for in black-and-white there's quite a possibility that your enlarged projection-dupe will be a bit grainy.

If you want to enlarge only a portion of the scene, making a long shot into a closer angle, there are in theory two possible methods. You could bring the camera closer to the screen, so that its field only covers a portion of the projected picture, or you can move the projector closer to the screen while the camera remains stationary, and only that portion of the scene you want enlarged is embraced in the camera's field. This latter method is by far the best, for if you keep the size of the projected picture constant and move the camera in to cover only a small part of it, you'll also enlarge the image of the texture of the tracing-paper screen, which will produce a grainy effect.

If you mount the projector on a sliding carriage such as many filmers use to mount the camera for making "zoom" titles, you can, with a bit of practice, "dolly" a projected long-shot into a closer angle by sliding the projector in toward the screen, while you (or an assistant) "follow focus" with the projector's lens so that the projected image is constantly in focus. This requires plenty of rehearsal, and nice coordination, but the effect can be very useful, especially in scenario films.

To reverse action by this method of projection, all you have to do is run the projector backwards while you rephotograph them with the camera running forwards in the usual way. In this, it's a good idea to remember that with some projectors you'll have to readjust the speed, as many of them operate slower in reverse than when going forward.

To make a scene longer, you've got two possible methods, always presupposing that the action of the scene is such that there won't be a jump if you cut from the end back to the beginning for a footage-stretching repeat. If the original scene is comparatively short, you'll have to shoot its full length, then stop camera and projector while you rewind the projected film to the start of the scene, and shoot again. With this method, unless your camera is one of those that automatically stops with the shutter closed, you'll probably find fogged frames between each take in your dupe, which of course you'll have to cut out.

If, on the other hand, your scene is long enough, you can splice the ends together, making a continuous loop which can run through the projector continuously until you've gotten the desired footage in your copy.

This idea of back-projection can be used to represent the screen in a theatre, as we did in the Long Beach Cinema Club when filming our production, "Judge Doolittle." The scenario called for a theatre scene showing the proscenium arch and the screen, with a picture being projected on it. The proscenium arch (in miniature) was painted on cardboard and placed in the titler. The screen area was cut out, and a back-projection screen of tracing-paper put in its place. A small lamp was used to light the proscenium and the scenes were back-projected as already described. These scenes of the theatre-screen were cut into the film with reverse-angle shots of the audience apparently looking at the screen, and the result was not only thoroughly convincing, but much better than if we had tried to photograph scenes projected on the screen of a real theatre.

All told, even though you've got to admit that we amateurs still can't do a lot of the back-projection and optical printer tricks the professionals use, there are certainly plenty that we *can* do by this back-projection method—tricks that will add a great deal to our home movies and the pleasure of making them. END.

Indians Had a Word

(Continued from Page 351)

"*mean*" temperature. We never brought the cameras into a heated room. They would then immediately have fogged between the lenses, and it might have been weeks before they were clear again. We kept the film outside because warm film loaded into a cold camera—or vice versa—usually produces static marks. Static marks in Kodachrome are flaring color, like forked lightning, flashing in all directions across the frames.

Extreme cold weather makes film brittle, too. I've seen Kodachrome break off like wafers in the cameraman's fingers when he threaded the Cine-Special on a fifty below zero day. Indeed, whenever the temperature was lower than thirty-five below, he had to be particularly careful loading the magazines. Apparently care is the only precaution or remedy—zero weather is beyond human control, even that of a cameraman!

A doctor gave us his diagnosis of other film troubles likely to arise in the Arctic. He'd been stationed on Baffin Island, within the Arctic circle, and had used an 8mm. moving picture camera there. Baffin Island's direct communication with the outside world happened once a year, when the *S. S. Nascopie* arrived. Only then could the doctor send out his film for processing.

When he received his first year's shooting back the following year, his expression must momentarily have been as blank as much of his film permanently was. Either by standing in the cold, or in the cold and then the heat, or both, the emulsion had been ruined.

We heeded the good doctor's diagnosis and kept our exposed stock in one temperature as much as possible. Only when we knew it would be subject to temperature changes—as when it had to be shipped out on the weekly train—did we bring it progressively into warmer places: from outside shed to unheated room to heated room furthest away from stove, and finally into our living-room's alleged warmth.

For interior work we kept one camera—a Filmo 70—at room temperature. Whenever we moved it from our lodgings to any location, we swaddled it like

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Lighting, of course, was a problem indoors in the North Moose Factory's Hudson's Bay Post did have electricity, but the current came from a 32-volt Delco plant and was entirely inadequate for even a single photoflood We had come prepared for this, however, and had batteries with us. We used two sets of three 45-volt dry cells, each set connected in series With these we could run two No 1's or one No 2 photoflood for about twenty seconds at a time This unit was adequate for foreground lighting of groups of one, two or even three people We managed the background lighting with daylight

We found that the bluish effect daylight will produce with Type-A Kodachrome could be offset if we did our shooting early in the morning or late in the afternoon when the sunlight which came through the large windows of the Hudson's Bay Post (where we were making our interior shots) was somewhat red. By using the batteries and the daylight, both intensified by as many tinfoil reflectors as we could mount at strategic positions, we were able to light up heated indoor areas adequately for Kodachrome.

But to do outdoor interiors—such as the tent on the trail—was almost an impossibility. Extreme cold affected our batteries to the point where they produced a current insufficient for even one No 1 Photoflood. We did manage, by having the batteries next to the stove, and raising the back of the tent through which to photograph (so that the camera would be at outside temperature) to get one or two shots of the trapper eating his evening meal, but only because light in tents is known to be dim, did we feel we could use these few shots

Out-doors on the daylight trail we might have had unsatisfactory results, too, if the cameraman hadn't been technically equal to the situation. He early learned that extreme cold contracted lens-setting rings so that they often refused to turn Consequently — rather than attempt to force them—he waited until one day the temperature rose to around zero and then set each of the five lenses he had with him at a definite distance setting, which he had figured out would be the most practical one at which to leave the particular lens in question His settings (calculated for maximum depth of focus) were

1-inch lens at 25 ft
2-inch lens at 4 ft.
3-inch lens at 50 ft.
105 mm. lens at 100 ft.
15 mm lens (wide angle) at infinity

Under shooting conditions, this meant changing lenses quite often, but the time entailed therein was nothing as compared to what would have happened if he'd tried to force setting-rings each time a different distance was required.

Only someone who has had to work under Northern winter conditions—and, further, has had to work with Kodachrome—can fully appreciate what the cameraman accomplished in the trapping film As the legal phrasing has it, "time was the essence" of our situation. For instance, the beaver season ended December 21st, and a beaver-trapping sequence was vital to our film. We were only able to make arrangements for our trip—fifty miles by dog-team—into the beaver country so that we arrived there December 19th Consequently we had to work fast

And then it began to snow!

With the film-speed of Kodachrome being what it was (and is), it began to look as if we wouldn't get any beaver sequence We started from camp one gray morning for the beaver dam We hoped against hope that the day would brighten; but it only began to snow harder And the location at the dam was ideal! Still it snowed

"I'm going to shoot We've got to," the cameraman said after taking a meter-reading through the falling flakes

"Try it," I said

"Try and stop me!" came his muffled reply He was already flat on his stomach, the camera tripod spreading its legs flat on the snow, too I heard the sound of the motor as he began to shoot the trapper setting the beaver trap

This beaver sequence, shot entirely in the snowstorm, has amazing color The snow is pinkish; it looks downright warm; and the buff of the trapper's parka and the black-brown of the beaver stand out most effectively against it. We found that Kodachrome reacts violently and unpredictably to snow, and the final color on the film is never white, but purple, blue, green, or, as in the snowstorm, a warm and delusive pink Snow in Kodachrome rarely looks really cold. But cold the snow was at James Bay; we can assure you of this! You'll see in the picture that it must have been, for, against the colored snow, the breaths of men and dogs stream in great clouds of frosty white

As "Kam-musson-ab-ski-gay" we might pass into the Indian lore of James Bay, but our tradition will inevitably always be a pale one in the fabulous brilliance of him who went before us. *Robert Flaherty!* He used Moose Factory as one of his bases when he made "Nanook Of The North" some twenty-odd years ago Indians have amazing memories and will tell you the detailed happenings of previous times as if they had occurred just the day before George Carey, Flaherty's guide, was living at Moose Factory and spent one afternoon telling us about the "Nanook" expedition George had not only acted as guide but also as interpreter One of the Eskimos spoke Cree; and George spoke Cree to him and the Eskimo spoke Eskimo to the Belcher Islanders and it got translated back into Cree for George to retranslate into English for Flaherty

Two ships Flaherty had; one he was forced to burn for fuel the winter he spent on the bleak treeless Belchers One thousand pounds of tobacco he took with him for the natives—not only tobacco, but rifles, knives, trinkets, goods of all sorts. A player-piano he had, and, of course, his violin. Even a monkey! If Flaherty had taken an elephant North, it could hardly have made a greater impression Our own guide, who was a child at the time, still talked about that monkey!

Keeping whole Eskimo families through the winter for his cast, developing his own rushes in fifty-gallon tanks for which snow had to be melted to provide water, and projecting his rushes for the natives—these were things we were unable to even approximate. We were two —and he had been one: but the two of us together were quite obliterated by the very shadow of Flaherty which, after nearly a quarter of a century, still darkens all other movie work in the James Bay area. What were the few packages of cigarettes we distributed among the natives against his half ton of tobacco! What were our little 16mm cameras, the results of which we couldn't even show the Indians, as compared with his immediate projection of the film he shot! But then, we can ask humbly, what is our little film, "Fur Country," compared with his immortal "Nanook?"

Indian memories may be reliable to the minutest point; but in their daily transactions the Indians themselves aren't. Perhaps I should qualify this statement considerably, and just call them so hopelessly casual

The most casual experience we had was in connection with the seven dogs we'd managed to pick up to form a scrub team for our trip up the coast of James Bay. We returned to Moose Factory on Christmas day, and told the guide to keep the team together We still had a number of connecting shots (for cutting purposes) to get of the team We were willing to pay the owners the fifty cent rental per dog per day until such time as we should finish our shooting of the team

That was fine

The next day the guide appeared and said, "The owner of Oscar wants to be paid"

It was holiday time, and I couldn't think of Oscar's Indian owner going penniless at this particular season; so I advanced the $6 00 which was coming to Oscar's owner.

The weather the next day or so was bad; but by the end of the month it had cleared Our guide appeared with the sunshine and we told him to get the team ready just as quickly as he could.

An hour or so later the guide returned. Against the brightness of the day he brought dark news. Oscar was on the trail with his owner—!

"But when I paid you, you said Oscar's owner wouldn't take him away," I said

"So did the owner," the guide replied.

There was nothing to say to that, but plenty to do. Oscar was the "prettiest" dog we had—a beautiful yellow husky. Furthermore, he'd been hitched nearest to the sleigh, which meant that in every

one of the many shots taken from the sleigh, Oscar was featured

The cameraman took the most pessimistic outlook—everything was ruined now, just ruined

"There are other dogs," the guide suggested in that accent that was so Scotch. From generations of association with the predominantly Scotch personnel of the Hudson's Bay Company, all the natives have this Scotch accent. The guide didn't say "dogs," he said "dough-ghs," dough like for bread with a hard "gh" sound almost imperceptibly blending at the end

"Go and see if you can yet any dough-gh that even faintly resembles Oscar," was all I could say.

The guide was gone an hour or two. Whenever Indians get together conversation becomes endless. Silent the Red Man may be with the white, but with his fellows he's as garrulous as a gossipping granny in a small town or a night watchman in a city. But this time our guide had done more than talk. When he returned he took us outside. Tethered to the white pickets of the Hudson's Bay Company fences were dozens of dogs—all colors, all sizes, and, to save the day, among them one that was Oscar's nephew, a perfect double! In the finished film, we defy audiences to tell which is Uncle Oscar and which Uncle Oscar's brother's son!

Our faith in the vanishing Red Man, which had come so near vanishing itself, was renewed. We finished our shooting without further undue troubles during the first weeks of January. Then we returned to civilization to see our rushes. Either the cameraman's technical ability had been unusual (as I know it to be), or we had been unusually lucky (which we probably were, too), or both. Anyway our rushes were all we'd dared hope they'd be. We had won in the best and fullest meaning of the translation the "Kam-musson-ab-ski-gay" title — *those who have taken pictures!* END

Rudy Maté

(Continued from Page 352)

tell him I had never photographed a picture before! Besides, he never asked! Anyway, he didn't tell me he had never produced one! Back in 1921 I didn't know many producers, and the name Alexander Korda wouldn't have been any more—or less—familiar to me if he had been the biggest producer in Europe. We made that picture, and several others, together, and educated ourselves professionally in the process. We were just a couple of young fellows trying to get along in a business neither of us knew much about . . . but I'm sure neither of us dreamed we'd get along so far that twenty years later we'd work together in Hollywood, on a picture like 'That Hamilton Woman!' which he produced and I photographed last year!"

Still seeking new worlds to conquer, Rudy went from Vienna to Berlin which was then, as it remained until the coming of Nazism killed it, the greatest production center in Europe. But Rudy never got a job in Berlin. Instead, he found in Berlin a producer who was looking for a cameraman to photograph a picture for him in Paris! So Rudy went to Paris, where he stayed for many years, photographing pictures for most of the French producers, both "major" and independent, including, Rudy comments wryly, "many Russian producers who probably hired me not so much because of my photographic ability, but because I could speak Russian! The Russians, you know, are like the English and Americans in one respect: they may live and work in a foreign land, and speak the language fluently—but they prefer to speak their own whenever they can. So I spoke Russian—and worked!"

Probably the most notable of Maté's French-made productions was "The Passion of Joan of Arc," which has earned indisputable rank as one of the three all-time great films produced in Europe

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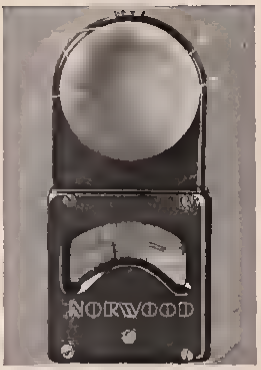

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in the middle twenties, and together with "Variety," and "The Last Laugh" exerted a dominant influence on the artistic course of the cinema during the latter days of silent filming. "Variety" sensationally demonstrated the dramatic values of unusual camera-angles and the moving-camera technique. "The Last Laugh"—probably the only successful silent picture ever made completely without subtitles—carried silent-picture story-telling to its highest development. And "Joan of Arc" showed what could be done with dramatic close-ups, for the entire story was told—and told powerfully—in close ups, seldom, if ever, employing even a waist-length figure. The extent to which the production depended on Maté's photodramatic artistry can well be imagined. Perhaps an even more striking example of what Maté's camera could mean to a picture occurred several years later in another French-made production—this time a sound-film—"The Vampire," which was acknowledged by press and public to be a success solely on the strength of Maté's exquisite camerawork!

But it is since he has come to this country that Rudy Maté has done his most outstanding work. Such pictures as "Dodsworth," "The Adventures of Marco Polo," "Foreign Correspondent," "Flame of New Orleans," "It Started With Eve," and most recently, "Pride of the Yankees," prove it. Generally speaking, European-trained cinematographers, when they come to Hollywood, have a slow and difficult time conditioning their minds and methods to American movie-making methods, some I have known have taken as much as a year and a half or two years before their Hollywood work was even remotely on a par with what they turned out in Europe. But Rudy Maté "clicked" in Hollywood almost from his first day's work, and has steadily built until his ability and reputation stand infinitely higher than when he came here, and when last winter Gregg Toland, A.S.C., went into active Naval service, leaving vacant what is generally regarded as Hollywood's top camera job, it was not surprising that the astute Samuel Goldwyn should pick Rudy Maté to fill the vacancy.

As might be expected from his background, Rudy Mate approaches his work in a very studious fashion. He likes, wherever possible, to spend several days—more if possible—studying and analyzing a script before production starts, so that he can plan and carry through a definite photographic progression in his treatment of the scenes and sequences he photographs. To him, the dramatic climaxes of a picture are also photographic climaxes, and camerawork, as well as story and direction, should build progressively and smoothly to them.

He's no slavish follower of tradition, whether artistic or technical. "Sometimes," he says, "a scene may benefit by being handled in a more or less routine manner. But there are other times when you may get the best results if you go directly against the conventional rules! For instance, even the most elementary amateur textbooks on lighting say you should never light a person's face from underneath, except when you deliberately seek a weird effect. But in photographing 'Pride of the Yankees,' I found a definite necessity for breaking this rule.

"I lit most of Gary Cooper's scenes from below. I used a soft lighting, it is true, but it came predominantly from this angle we are taught never to use. That treatment, as I found from advance tests, 'ironed out' the natural wrinkles on Cooper's face, and made him appear much younger than his real age, as was dramatically necessary in most of the picture. Only in the later sequences, when he was portraying Lou Gehrig as an older man, and in failing health, did I light him from conventionally higher angles. The result was that he looked older in these scenes, and we got the dramatic effect we wanted very easily, and with a minimum of make-up. The camera in this instance definitely aided Cooper's fine characterization.

"The same thing holds true of my early study of the history of Art. It was about the only real preparation I had for a photographic career. But if I had deliberately tried to imitate the work of the painters I had studied, I am sure I would never have been at all successful. It is one thing to let yourself be influenced by what you can learn of the way these old masters approached the problems of composition and lighting. It is quite another thing to attempt to copy them directly on the screen. They had their medium, and you have yours, and any attempt at direct imitation would give you something which was certainly not a painting—and just as certainly not a real motion picture. But if you can translate their mental approach, and maybe their dramatic feeling, to your medium as you would translate something from one language to another, you will find your own artistic skill benefiting correspondingly."
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Lighting for Kodachrome

(Continued from Page 349)

fluencing the color-temperature of incandescent lamps is the voltage at which the lamps operate. It is a well-known fact that operating an incandescent lamp at less than its rated voltage will cause the light to be either yellowish or even reddish as compared to the same lamp's output at normal voltage. Likewise, operating a lamp at higher than the rated voltage will increase the color-temperature, making the light a more bluish white, and will also increase the quantity of light produced.

The makers of Photoflood lamps make use of this latter fact to gain increased performance from these lamps. Photoflood lamps were originally designed to operate at comparatively low voltages (about 60 or less, I believe) and to give about the same output and color-temperature as ordinary house lamps. But it was found that by operating these low-voltage lamps at about twice their regularly rated voltage, then light output was increased to a sensational degree, and the color temperature was also considerably increased.

Since these Photofloods had become the established medium for interior lighting of home movies by the time the Kodachrome process was introduced, it was only natural for the Eastman engineers to standardize on the Photoflood's color-temperature when a Kodachrome emulsion for interior use was evolved. The color-temperature of Photofloods, while much higher (whiter) than that of either ordinary household lamps or the standard Mazdas used in black and white studio cinematography, is still much lower—or redder—than that of daylight. In other words, the light of the Photoflood globe is deficient in its emission of blue and green light as compared to its emission of red and yellow, even though it is much bluer than standard Mazda light. Daylight Kodachrome, photographed under Photoflood lighting, would give an unnaturally ruddy cast to everything in the picture.

In the old two-color Technicolor process, this difference in color-temperature between natural and artificial light was compensated by using a different set of color-separating filters in the camera when photographing under artificial light. In the present three-film Technicolor process the compensation is made by using light (usually from arc sources) matched to the daylight standard.

Neither of these was practical for amateur use, so the Eastman chemists ingeniously made the necessary compensation by increasing the sensitivity of the blue- and green-sensitive layers of the "Type A" Kodachrome emulsion. The result is that "Type A" Kodachrome is color-balanced to Photoflood illumination, *or its equivalent in color-temperature*.

For interior lighting on a professional scale, especially in the studio, lighting with Photoflood globes in the small floodlighting units made for amateur use would be at the least inconvenient. But fortunately there are globes available which produce light of approximately Photoflood color-temperature, but are made in sizes and types which will fit into standard studio lighting units. The Seniors, Juniors, Baby Juniors, Broads, strips, Kegs, etc., of Mole-Richardson and Baldwell-McAlister, with which most studios are equipped, are adaptable to Kodachrome production by merely replacing the regular Mazda globes with the so-called "CP" globes, which burn at almost exactly the same color-temperature as Photofloods.

These "CP" globes are the same ones as used for Technicolor interiors; but there is a very important difference in the way they are used for Technicolor and the way they are used for Kodachrome. For Technicolor, these globes, which burn at a color-temperature of 3380 K, are always used with a special "daylight blue" filter which, by suppressing most of the red radiation, raises the color temperature to a figure above 5300 K, so that these lamps effectively match the Technicolor daylight standard. *But when used for Kodachrome with the "Type A" emulsion, no filter need be used, since the film itself is balanced to match the color of unfiltered Photoflood and CP globes.*

The same thing applies to the use of the arc lamps generally employed in Technicolor lighting. Since these lamps are engineered to match the color temperature of normal daylight, then light will be much too blue for Type A Kodachrome, though it would be perfect for use with the regular or "daylight" Kodachrome.

The standard Mazda lamps normally used for black-and-white, as has already been mentioned, burn at a color-temperature too low to give satisfactory results with the Type A emulsion. They will give much the same effect as a "raw"

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inkie in Technicolor—a reddish tone which may at times be useful for special firelight and lamplight effects in backgrounds, but which is not pleasing on people, or desirable for overall lighting. It may at times be confusing when one sees still photographers making successful Kodachromes with this lighting, but it must be remembered that for professional still photography in Kodachrome a special emulsion, known as "Type B," is made, which is balanced to the 3200 K color-temperature of standard Mazdas. "Type B" is not available as a motion picture film.

In addition to the Photofloods—No. 1, 2, and 4—and the "CP" professional globes ranging up to 10KW sizes, there is another globe of high color-temperature which is also suitable for Kodachrome use. This is known as the "Movieflood." It is essentially an oversized Photoflood-type globe of 2,000 Watts output, with a PS-52 globe and a mogul screw base. It is available in either clear or inside-frosted globes, and burns at a color-temperature very slightly higher than that of the Photoflood and "CP" globes—3,400 K instead of 3,380 K.

The Movieflood, together with the three types of Photoflood, is especially valuable in making interiors on location, as in factories, etc., since these lamps (especially the Movieflood) deliver a large amount of light at a minimum consumption of current, and may be used in a variety of reflectors, including some types which were made specifically for such portable use.

The most striking difference between black-and-white and Kodachrome lighting is the great quantity of light required for adequate color exposure. In lighting interiors of average size for long or medium shots it is almost impossible to get too much light for Kodachrome exposure. Probably the most likely cause of poor color reproduction in such scenes is lack of sufficient light in all parts of the scene. Each important part of a scene must have its own lighting unit supplying in itself almost enough light for exposure without taking into consideration any spill-light from other units and areas. Every corner, every surface, every area must be strongly "painted" with light if its true color is to show in the Kodachrome reproduction. It is an advantage to be able to use many small units to distribute the light uniformly over the scene, rather than to depend on a smaller number of larger units.

Because of the intensity of light required and the heat generated, it is a good policy in making professional studio interiors in Kodachrome to have the equipment set up so that the Photoflood, Movieflood or "CP" lamps can be operated at about ½ rated voltage during lining up and rehearsals. This method saves current, adds noticeably to the life of the lamps, and makes working conditions on the set much more comfortable.

The simplest way to accomplish this is to connect two similar sized lamps to a switch which in one position connects them in series, and in the other position, in parallel. Another method is to have a rheostat on each lamp, or to wire groups of lamps on a good-sized dimmer-bank, so that except when actually shooting, the voltage may be reduced.

Incidentally, it should be stressed that in Kodachrome production, exactly as is the case in Technicolor, the dimming rheostats which are used so extensively in black-and-white cannot be used, since in addition to altering the intensity of light, they also reduce the color-temperature.

Maintaining correct voltage in lamps is important in black-and-white, but it is very much more so in Kodachrome. It is probably more important for the professional cinematographer or gaffer to continually check the voltage and color-temperature of his interior illumination than it is to check on color-temperature in making daylight exteriors. When the electrical load required for adequate Kodachrome exposure is placed on even a studio line, some drop in voltage is almost certain to result, and it may even be sufficient to adversely affect the color-balance of the scene. This is especially the case when the stage is on the far end of a long power-line, in which there would be a noticeable voltage-drop anyway.

This is almost certain to happen in lighting location interiors unless the producer is able to supply rated voltage either from his own portable generators or by a direct cut-in on an ample power-line. An accurate voltmeter for checking line voltage *at the lamps* for Kodachrome production is almost as important an accessory as an accurate exposure-meter. If the voltage is low and cannot be raised, then a certain amount of color-temperature compensation by means of filters may be used, though of course at the cost of having to increase exposure to offset filter-absorption. Here again a color-temperature meter is valuable in the hands of an experienced operator.

Second in importance to voltage in determining the color-temperature of lamps used for Kodachrome lighting is the age of the lamp. Generally, the color-temperature of a new lamp will be slightly higher than its rated value, and its color-temperature decreases with age to a value below its rated efficiency by the time it gets near the end of its

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useful life. This is especially true of the over-voltaged Photoflood-type lamps In production on a professional scale it may be economically worthwhile to keep a record of the number of hours a lamp is used and to discard it before it is actually burned out, because of its change in color-temperature. As mentioned previously, lamp life—and with it color-temperature efficiency—can be greatly extended by burning lamps at lower than rated voltage except when actually shooting

It is very important to avoid mixing light of different color-temperatures when shooting in Kodachrome Mixing light is almost bound to occur in shooting location interiors where a large amount of window or sky-light illumination is present Professionally satisfactory color reproduction cannot be obtained under such conditions, but there are fortunately some ways this can be offset

One way is to photograph location interiors by night, with only Photoflood or similarly correct illumination, with of course no embarrassingly blue daylight illumination coming in from the outside. Another is to minimize the amount of daylight entering the scene by drawing curtains, shades or venetian blinds when this is possible Still another solution is to cover all the windows or skylights contributing to the scene with a pinkish gelatin filter—or even paint—which will tend to filter out the excessive blue and green of daylight and make it more nearly match the color temperature of the Photofloods.

Yet another solution is to use daylight Kodachrome for such interiors, and light with daylight-corrected Technicolor-type arcs or *filtered* "CP" incandescents. A variation of this is to use daylight Kodachrome and light with the blue-bulb "daylight" Photofloods However, this method is not as likely to give professional results as some of the others because the color-temperature of these so-called "daylight" Photofloods is actually considerably below that of real daylight, and the mixture will give a slightly yellow-toned picture with the bluer daylight evident wherever it strikes

Although filters are available for adapting "daylight" Kodachrome for use with Photoflood illumination, and for using "Type A" Kodachrome in daylight, neither of these methods is satisfactory for professional production use The color reproduction possible when using "daylight" Kodachrome in daylight is far superior to that obtainable with filtered "Type A," and likewise "Type A" Kodachrome used with Photoflood or "CP" duction than is possible with "daylight" Kodachrome and a filter In addition, the latter filter greatly decreases film-speed under conditions where all possible speed is required If it were possible to make one film which would be equally satisfactory in either daylight or artificial light, and could be controlled by the mere addition of filters, we may be sure the Eastman experts would not have complicated their film-making problems by making two different emulsions For truly professional results each Kodachrome emulsion should be used under the conditions for which it was made (To be continued.)

Industrial Training Films

(Continued from Page 347)

action of the gases released in the operation.

It is hardly to be wondered, then, that General Electric, once having seen the first of these pictures, insisted on obtaining exclusive rights to distribute the entire series of six, which are now playing an important part in training skilled welders for the war effort

At the other end of the country, in New York, Emerson Yorke has brought a similar new slant to the production of eight reels of technical training films for the U S Office of Education These pictures were designed to speed the training of the overalled army of machine-tool operators so urgently needed in our War Industries, and they, too, imposed technical problems which called for a completely new method of photographing and presenting some of the key scenes.

It is easy enough, for instance, to show the basic operations of a lathe, for the operations generally take place on the outside of the metal being worked But when holes are being drilled in a piece of metal, or a tap being used to cut a thread inside a hole, the problem is entirely different, because the vital action is taking place *inside* the block of metal being worked The conventional method of showing operations like this has been to use line animation, supported, perhaps, by a cross-section breakdown But this is not always satisfactory, for in the one instance, it shows what is, in theory, *believed to happen*, and in the other, something that *has happened*, rather than what *is actually happening*. In other words, there is too much theory, and too little actual proof

To meet this challenge, Director Yorke and Cinematographer Edward Hyland made use of modern materials which permitted them to show the action in a clearer and more modern way. Many plastics can be turned, drilled and tapped in exactly the same way as metal and some of these plastics are translucent One of the latest of these—lucite—is almost perfectly transparent So Yorke and Hyland substituted lucite for metal in these scenes which dealt with operations inside the metal

The resulting shots show in almost perfect detail the actual action of a drill or tap inside the lucite, exactly as it would happen inside a block of steel Close-ups shot from various angles show not only how the tap or drill works, but how binding action can be caused by an improper accumulation of chips, and so on.

Another problem cinematographers have always faced in making films of

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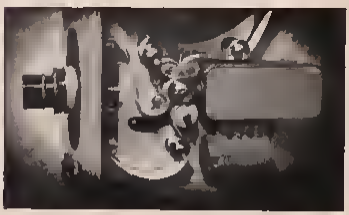

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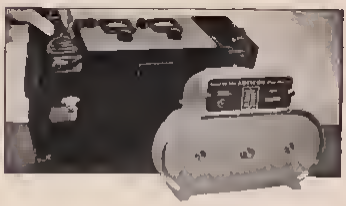

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this nature is that of stroboscopic action when photographing revolving parts, such as the bit of a drill, or a piece of metal turning in a lathe. Sometimes this phenomenon makes the revolving object seem to stand still; at other times, it may apparently reverse its motion, according to the way the movements of the drill and of the camera shutter happen to synchronize. For instructional purposes, this is a distinct liability.

Yorke and Hyland solved this problem by making the stroboscopic action work *for* them, rather than *against* them. They planned the distribution of lighting for these scenes not only as to area, in the usual photographic-lighting sense, but as to timing. While for rather obvious reasons, they have not cared to disclose the precise details of their method, it can be assumed that they utilized something very similar to the principles pioneered by Edgerton in his strohoscopic super-high speed movies (seen commercially in the MGM Pete Smith short, 'Quicker'n' a Wink") and lit at least the revolving bit of the drill with intense flashes of light, carefully timed to synchronize not only with the camera's shutter, but with the speed at which the drill revolved. In this way, each successive frame-exposure would show the drill slightly ahead of its position in the previous frame, rather than in perhaps the same apparent position, or advanced just less than a complete revolution so that it appeared to be behind the position in the first frame. Thus, the drill would move naturally on the screen.

It is not difficult to foresee an even greater surge toward the use of motion pictures—logically in direct 16mm.—for "how-to-do-it better" instruction among our civilian defense industries as pictures of the type and calibre of those just mentioned get into more general use. And that is the cue for the commercial producer who is not yet making films that contribute to the War Effort to swing into action. From the film-selling angle, it should not be so hard to convince many a potential sponsor who in pre-war days might have balked at the idea of a motion picture to help him secure orders for his product that now that he has the orders, a film showing the proper and most efficient use of his product would be beneficial in two ways. Not only would it serve the immediate patriotic purpose of speeding the herculean task of training our vast new army of machine-shop soldiers, but it would help cement his firm and product in the minds of the foremen of today who may well be the superintendents and purchasing agents of a post-war tomorrow. Such pictures are in truth double barreled ammunition for the battle of production.

But if they are to be, they must not be approached by the technicians, directors and story-creators who make them in a routine spirit of "let's-make-them-this-way-because-they've-always-been-made-that-way." These films, and many others for wider distribution on such subjects as civilian defense, first aid, salvage of scrap, and conservation of resources, will constantly present to their makers new problems in technique and presentation. These problems can no more be solved in routine methods than were those already described. But if the makers and technicians of 16mm. business-films see in them a challenge to the ingenuity of which they've so long boasted, out of this emergency will come new technical ideas, and new ideas of presentation. With them, these films will not only do a powerful bit to aid in winning the war, but can also serve as a practical proving-ground for ideas which may well revolutionize the making of business and instructional films for years to come.

The purchasers of these films are here, for war contractors and their suppliers and sub-contractors clearly recognize the need for effective instruction of employees. The audience is here and enthusiastic, for the hundreds of thousands of new employees in our war factories recognize their greenness, and are ready to accept anything that will help them do their work better.

It is up to the makers of business films to say if the films are to be here, too. The mechanism for producing them in the necessary quantity and variety already exists among the business-film studios scattered from coast to coast. The need is here—now. So is the opportunity! END

Cartooning

(Continued from Page 346)

when on the scoring stage is provided with an earphone over which he hears an intermittent high-frequency note indicating the exact tempo. In the case of a free-beat, or indefinite tempo, a "beat loop" is prepared by the cutting department. This is simply a length of blank leader film with holes punched at the side ordinarily occupied by the sound track. These punch holes are spaced according to the lengths apart of the musical accents, at so many feet or frames. The film is spliced in the form of a loop, so it can be run over and over again on a playback machine up in the projection booth and "piped" through to the earphones of the musicians. They listen to this loop a few times to get used to the timing before attempting a "take." Each of the earphone beats corresponds to a measure of music, and it's just a matter

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of following the beats along with the score

Recorded music, like everything else along the cartoon production line must be checked, passed upon and okayed. Retakes of music are rare, unless something goes haywire during the developing of the negative. Overall balance and harmony are checked upon during the recording session by acetate disc playbacks which are made while the film recording is taken.

Up to this point, all of the noises that form a part of the final sound-track of the finished picture have been kept separated from each other on different reels. Dialog is on one, and the sound-effects might be on one more, or two, depending on their number of complexity. Music is on a track by itself. All of these tracks are on reels, each as long as the picture. They may be made up for the most part of blank leader, with the strip of film that is the dialog or sound-effect take cut in at the proper point to synchronize with the picture.

These multiple tracks are a necessity, as no two sounds can occupy the same spot on one track at once, unless they're dubbed. But up until the dubbing, or re-recording, they have to be kept on separate tracks. On one track there is music. On a couple of more tracks might be two pieces of dialog going on simultaneously. And there also might be a couple of sound-effects filling in the noise background. At the final re-recording session, all of these sounds must be fused into one track, each in the proper balance with the other. Neither sound effects or music, for example, should drown out the dialog. Then again, a certain sound-effect might have to be dialled up to provide a sudden accent. These, and other similar considerations, are taken care of at the re-recording session.

Each of the separate sound tracks is run on a playback machine, or film phonograph, in sync with the picture reel. At Disney's, the re-recording is done in the studio theater, under ideal acoustical conditions. The sound emanates from the screen speakers, and the sound-men concerned with re-recording can judge levels and balances under perfect theater conditions. Halfway down among the seats is situated a control-board, with individual dials governing each playback machine up in the projection booth. Each sound-man handles a couple of tracks, judging the proper sound balance by alternately watching the screen and a "score sheet" on which is indicated the positions and volume-levels of all the sounds in relation to the picture.

The picture is run through and through several times, all tracks going full blast, until the sound-men gradually learn what sounds to pull down and which ones to give a little more "gain." Within a few frames, music might be required to drop down to a third of the volume at which it had been running. At another strategic point, where Bambi might take a running jump and flop across a log, the music and sound-effect syncing with the flop would be dialled up suddenly to accent with the action. Many rehearsals are necessary before the men at the dials become accustomed to coping with all these required changes in volume.

Finally, when all of the music, dialog and sound-effects are presented in proper balance through the screen speakers and everyone performs his dialling in perfect coordination, a "take" is made. The picture and tracks are run again, the sound-men at the dials go through their routines, and the sound, as re-adjusted by their dialling, is piped through a separate channel into a sound recorder and onto film. If someone misses a cue and fails to dial a sound up or down at a crucial spot, a new take must be made. Otherwise, they "wrap it up," and order a print.

But the picture and sound aren't wedded together yet. Comes now a preview, with all the consequent possibilities of further cutting. So, at the preview theater, the silent color work-print is run with the newly dubbed track, using two electrically interlocked projectors, one for the picture and the other for the separate sound-film. Of course, on the screen, the effect is just the same as of a completed release-print.

If the preview audience laughs in the wrong places, if there are slow spots, if certain gags fail to get over—all this means work for the cutting department. The bad spots are trimmed out, and then if it's the general consensus of opinion that no more can be done to the picture, the picture and sound-track negatives, freshly cut, are bundled off to Technicolor to be finally joined together.

From here, the couple-hundred release prints start their journey through thousands of projectors, running the gamut from first runs to jerkwater gimlihouses years later, and eventually earning a well-deserved rest in some film vault. And during all this time, the process just outlined is being repeated over and over again, in varying degrees. With the proper spirit of improvement present, each resulting picture should be just a little better in some way than its predecessor. Most of those improvements are along technical lines, for they are tangible somethings that can be seen, compared, and felt. These elements are animation, drawing in general, layouts,

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Ideas, gags, and conceptions, being of the mind and consequently as intangible as any thoughts, are always slow to catch up with technical improvements. However, abuses of the animated cartoon medium by bad conceptions and irrelevant material are gradually becoming fewer and fewer. Those responsible for the creative development of the cartoon are learning what sort of material is best suited to the scope of the cartoon, and what is not. Of course, these lessons were all learned by bitter experience—by "trying out" something, seeing the fallacy of its conception, and from there steering clear of similar mind-wanderings in the future. Many of these painful experiences resulted from attempting to do what the live-action camera could have done a lot better.

One indeterminate factor, however, which will always retain a semblance of uncertainty, is audience appreciation. Years of experience in producing cartoons have shown pretty well what the *average* audience is likely to laugh at and what it won't. But unfortunately, all audiences aren't average. The studio crowd will get a kick out of something that wouldn't faze the phiz of a retired farmer. Swing-shifters have different slants on things than do Ladies' Aid Societies.

But luckily, the animated cartoon, in its present-day development, has more to offer than just laughter. Amusement is not the only sign of enjoyment. With improvements in cartoon technique, it can be found that color, music, movement, and characterization are just as important as humor in purveying entertainment. A beautiful scene is every bit as entertaining to some people as a belly-laugh is to others. The animated cartoon is an unparalleled position to exploit these new fields of enjoyment. A new field of tremendous possibilities is also being opened up by the wartime use of animated cartoons to instruct—turning hitherto uninteresting, academic subjects into lively, instructive pieces of entertainment.

It remains for much more to be written and spoken regarding the unlimited future of the animated cartoon, but it's enough to say now that no one is more completely cognizant of this future than the man responsible for the high place now occupied by the cartoon—Walt Disney. And it's quite liable to be found in the very near future that this new medium of entertainment and instruction will have outgrown the title "cartoon" as much as modern live-action motion pictures have graduated out of the class of "flickers." END

"Pre-Photographing"

(Continued from Page 343)

of them, like the recently-introduced "Auricon" single-system camera, produce sound that is entirely adequate for purposes like this, yet are available at a cost very little greater than that of the better silent 16mm cameras with which several of our studios are already equipped.

Sixteen millimetre sound-projectors are available in ample variety to make this "pre-production" system very flexible. The powerful arc projectors already used in several studios for screening silent 16mm tests need only the addition of sound pick-ups and amplifiers to permit the screening of these 16mm sound-films in the largest studio projection-rooms. Some of the smaller 16mm. projectors already in use in the studios could also be equipped with sound, and used for studying the picture in smaller rooms, such as offices, directors' and producers' homes, and the like. Finally, 16mm Moviolas and—perhaps still better—extremely small, portable sound-projectors with a self-contained screen and speaker, like the "Movie-Mite," are available and could be kept right on the set so that director, cinematographer and players could study the "pre-photographed" scenes on the set as they prepared to film the final, 35mm version of the same scene.

The choice of film is a debatable question. From the viewpoint of economy in both film-cost and lighting, black-and-white reversal films comparable to the Plus-X and Super-XX negative customarily used in 35mm. offer considerable advantages. On the other hand, for Technicolor productions, Kodachrome might in some ways be advisable, while even for "pre-photographing" black-and-white productions Kodachrome would offer the potential advantage that even if it requires considerably more illumination, and costs rather more than 16mm black-and-white, the grainless structure of the Kodachrome image is such that if—as might occasionally happen—some player should hit an emotional peak in the 16mm. test take of a scene, and could not recapture it in the later, 35mm filming, the 16mm take could be enlarged to use in the 35mm release with at least adequate results.

All told, it would seem that this idea of "pre-photographing" productions in 16mm. offers many advantages, and few disadvantages. There's an old saying that it's worthwhile to "throw a sprat to catch a herring," and it seems to me that since this system offers, at the negligible cost of a few thousand feet of 16mm film (each foot of which uses but half as much celluloid as a foot of 35mm film, and gives 2½ times as much screen time per foot) and a few days' additional shooting, a chance to reduce consumption of 35mm. film to a hitherto unheard-of degree, it is well worth a trial. In addition, "pre-photographing" a picture in 16mm. offers the added advantage of being able to make your 35mm. production, so to speak, *after* you've already made and previewed it—something for which we've all wished at times.

With these immediate advantages offered, does it not seem possible that the idea of "pre-photographing" our pictures in 16mm is well worth trying, not only as a means of realizing our immediate, patriotic objective of conserving film and materials, but also as a potentially very valuable aid in our perpetual effort to make better pictures, more efficiently? END

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By adding a hand crank to your Filmo 70, all the tricks that depend on ability to rewind the film within the camera are yours. The hand crank permits you to wind the film back and expose it a second time for making lap dissolves, titles on moving backgrounds, etc., and the clever frame counter permits accuracy. Normal forward motion of the film may also be accomplished with it. The hand crank is detachable. Installation can be made at our Chicago factory only. Price, including crank and frame counter, is $27.50.

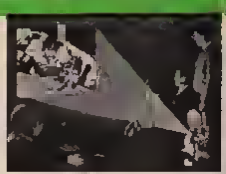
3-Lens Turret Head for Filmo Auto Load and 141

A three-lens turret can be installed on any Filmo Auto Load or 141 camera. The three-lens turret gives your camera versatility far greater than is possible with a single lens, because by rotating the turret, the lens for any situation is instantly ready. Furthermore, as you rotate the turret to change from one lens to another, the positive viewfinder is changed automatically. Installation is made at our Chicago factory and requires about two weeks. Price for installation on 141 or Auto Load, not including lenses, $85.

New Exposure Dial for Filmo 141, Auto Load, or Auto Master

This new dial provides a more versatile exposure guide for either color or black-and-white. It covers *all* of the factors that affect lens diaphragm setting, including the time of year and the hours of the day. It is an inexpensive addition to your Filmo 141, Auto Load, or Auto Master camera that goes a long way in bringing it up to date. Installation can be made at Chicago or any branch. Price of dial for either 141, Auto Load, or Auto Master, $4.50.

Step Up Illuminating Power of Your Filmo Projector



Get This... ***Instead of This***

Within the past few years, startling improvements have been made in projector illuminating power. If your projector is one of the earlier models built before these improvements were made, you can now have them at a conversion cost much less than you probably expect.

Color films absorb more light than black and white. A more powerful light is therefore needed to project a clear, brilliant color movie on the screen.

Just how much difference today's high-powered lamps make in screen results is something you can't fully appreciate until you see it. When you see the new beauty and sparkling detail that today's brilliant illumination gives your own films, you will want your Filmo brought up to date. We suggest that you take your projector to your dealer. See the difference in today's illumination, discuss with him the conversion you want, and let him send the machine to us. He can quote you the exact price for the conversion you elect.

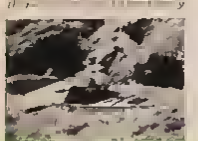
Send for new booklets illustrating these and many other modernizations for Filmo Cameras and Projectors.

Install Pilot Light for Convenience in Threading

If you have a Model 57 16mm. Filmo Projector, you'll find the new pilot light, which can be installed at moderate cost, a great convenience. It has a "built in" appearance and is mounted so as to illuminate the sprockets and film gate. It makes threading easy without turning on the room lights, turns off and on by pushing or pulling the polished metal cap. Projectors must be sent to the factory for installation of this pilot light which is the same as now used on current Filmo Projectors. Price $14.50.

What's New in the FILMOSOUND LIBRARY

FIRST AID FILMS. Do you really KNOW the basic principles of rendering first aid? These are days when everyone should—and there is no better way to learn than through movies. The first aid films available to you through Filmosound Library are praised by first aid teachers, physicians, and laymen. They are used in schools, factories, by defense councils, police and fire departments. The rental cost, as you know, is slight.



CRUISING THE GRAND CANYON. This film takes you on the greatest thrill ride in America and gives an interesting, educational view of the "world's biggest ditch" from an unusual angle. The trip ends at Boulder Dam.

The Filmosound Library offers you every type of film from one comprehensive source. Send for catalog of more than 3000 selected motion pictures.

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